Castlight Impact: Assessing the Savings Attributed to a Digital Health Navigation Platform

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Aims: Digital health navigation platforms can provide a single access point to guide consumers through their healthcare journeys in ways meant to streamline care and curb costs. Still, the financial impact of these technologies remains largely unknown. Given the rise of healthcare spending in the United States associated with the overuse of costly health care services, it is important to consider the impact that these platforms have on medical spending. The aim of this study was to develop and present an approach to assess the impact of a digital healthcare navigation platform on total medical spend based on user engagement. Additionally, analyses were performed to show the impact of the Castlight platform on user medical spend.

Materials and Methods: A risk-adjusted savings analysis using Cotiviti's DxCG Intelligence software was performed on claims data collected from the book of business of employer clients of Castlight Health's digital platform for CY2019 and CY2020. Data included medical claims, demographic information, clinical diagnoses, and platform utilization information. Total medical spending was calculated for all clients, for clients with the highest levels of engagement, for subpopulations at risk for high spending (low back pain and high-risk pregnancy), and for two specific claims categories (ER and outpatient visits).

Results: In 2019, users engaging with the Castlight platform had lower medical spend by 5.3% ($149 PMPY) as compared to the non-users within Castlight client populations. In 2020, user savings increased to 5.5% ($165 PMPY). For clients with the highest user engagement, user savings in medical spend increased over our book of business at 6.3% in both 2019 and 2020. For subpopulations at risk for high medical costs, including patients with low back pain, medical spend reduced in 2019 by 2.0% ($117 PMPY), with the reduction in user savings increasing to 2.9% ($73) in 2020.

Limitations and Conclusions: For self-insured employers seeking tools that can enable their employees to navigate the healthcare system while reducing cost, the Castlight platform is a promising solution.

Introduction

In 2019 healthcare spending in the United States increased 4.4 percent from the previous year, costing the healthcare system $3.8 trillion [1]. Much of this increase has been attributed to fragmented care delivery and the lack of transparency about the cost of services relative to their potential health benefits [2,3]. Consumers often find themselves without the information they need to navigate to high-value care, which leads to overuse of unnecessary healthcare services and associated escalating costs [4,5]. With medical cost trending expected to increase by up to 6.5% in 2022 [6], employers are increasingly looking for solutions that can help guide their insured employee populations toward cost-effective, high-quality care [7].

Since 2016, the number of employers relying on digital health apps to improve employee engagement in health and wellness initiatives has increased by 46%, and the adoption of digital health solutions is only expected to increase [8]. Digital health platforms can activate individuals and provide a single access point to guide them through their healthcare journeys--allowing them to research health plans, select providers, and estimate and compare costs for accessing services [9]. Digital technologies have led to reduced medical spending associated with somatic disease interventions and chronic disease management [10-13]. Disease prevention and wellness interventions delivered via digital platforms have resulted in savings by making it easier for individuals to incorporate informed healthcare decision-making into their everyday lives [14]. However, although mounting evidence supports the efficacy and cost-effectiveness of digital health solutions, procedures for conducting economic assessments that shed light on ROI remain inconsistent [15,16]. To communicate a

digital health solution's impact, it is important to clarify its value in terms that make sense in the healthcare marketplace, such as care quality relative to cost [17].

In this study, we present a risk-adjusted savings approach used to calculate the impact of user engagement with a digital healthcare platform on total medical spend for CY2019 and 2020. We believe that the results provided by this method provide a statistically rigorous, credible savings assessment that can be generalized to the broader self-insured employer marketplace. Additionally, we present an analysis of the impact user engagement with the platform had on total medical spend savings across multiple categories. We calculate 1) savings for users across all clients, 2) savings for users at clients with the highest levels of engagement, and 3) savings for users in subpopulations at risk for high spending (low-back pain).

Methods

We performed a concurrent, risk-adjusted analysis to quantify the reduction in spend for users engaged with a digital health navigation platform.

The Health Navigation Platform

Since 2010, Castlight Health has provided a virtual health and wellness navigation platform to self-insured employers as a benefit for their employees. This health navigation platform provides users with cost, quality, benefits coverage and other information to enable better decisions about the healthcare choices available to them. Taking into account unique member information such as clinical history, health assessments, personalized goals, and detailed information about their benefit design, the

platform's navigation features "steer" users toward healthcare resources in ways intended to unlock better healthcare outcomes and maximize return on healthcare investments.

Data Sources

We analyzed medical claims, demographic information, clinical diagnoses, and platform utilization data for our book of business in 2019 and 2020. For 2019, approximately 2.7 million commercially-insured individuals from 73 Castlight clients were assessed. In 2020, approximately 2.5 million commercially-insured individuals from 48 Castlight clients were evaluated. Eligible clients for inclusion in this analysis had to be an active customer with access to the Castlight platform at least 6 months prior to the end of the measurement period and have at least 2,500 members with access to Castlight's care navigation platform. All data and medical claims were anonymized and normalized across all clients.

DxCG Intelligence

We used the well-validated DxCG Intelligence risk adjustment and predictive modeling software for this analysis (Cotiviti [18]). DxCG Intelligence uses predictive models to calculate an individual's health and financial risk. Aggregating the risk scores of individuals with similar key attributes generates group-level predictive results that can help answer critical questions about healthcare costs, utilization, and quality.

Assessing the Impact of the Platform on Total Medical Spend

We used claims data to evaluate the savings associated with user engagement with the care navigation platform. The steps for this approach included 1) determining

the included population for the analysis, 2) establishing risk cohorts within the included population, 3) dividing the risk cohorts into user and non-user segments and 4) calculating risk-adjusted per user per year (PMPY) user savings.

Determining the Population

All members (including spouses and dependents) who were eligible for medical coverage and had access to the care navigation platform for at least two months were included in the savings analysis. Total medical spend, including employer spend and member out-of-pocket, was aggregated for all eligible members.

Establishing Risk Cohorts

Members were assigned into one of five risk strata based on DxCG ranges, as outlined in Table 1 [18]. Risk scores were assigned using the DxCG proprietary risk model at an individual member level. Members in the very high risk cohort were included in the analysis, but excluded from results.

Table 1. Risk score range for each risk stratum

	Very Low Risk	Low Risk	Medium Risk	High Risk	Very High Risk
Minimum Risk Score	0.0	0.5	1.0	2.5	7.5
Maximum Risk Score	0.5	1.0	2.5	7.5	∞

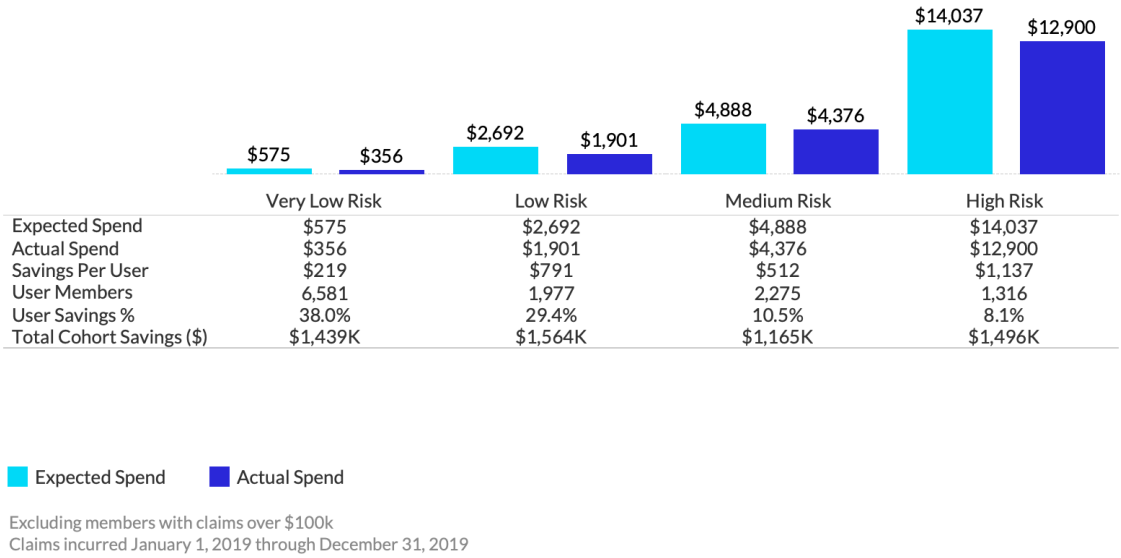
Dividing Cohorts into User/Non-User Segments

Risk cohorts were then segmented into user and non-user groups using platform registration and engagement information. The user segment within each cohort was defined as any eligible member who completed platform registration before the end of

the analysis period and had at least one additional login or opened an application-generated email. The non-user segment within each cohort was defined as any eligible member who did not complete platform registration prior to the end of the analysis period. Eligible members not meeting the criteria for either cohort were excluded from the analysis (e.g., members who only registered but never returned). Segments with fewer than 50 member years were also excluded.

Calculating the User PMPY Savings

Within each cohort, the average risk score and per member per year (PMPY) spend was calculated for both user and non-user segments. The user expected spend (if the user had not engaged with the Castlight platform) was determined by risk-adjusting the non-user allowed spend to account for variation in the risk between the user and non-user segments. The savings in medical spend associated with the user segment within each risk cohort was calculated as the difference in the average actual user PMPY medical spend and the user expected PMPY medical spend. The percent of savings associated with user engagement with the platform was determined by taking the ratio of the average user PMPY medical savings over the user expected PMPY medical spend. A sample client-based output for the Risk-Adjusted Savings Analysis is shown in Figure 1.



	Very Low Risk	Low Risk	Medium Risk	High Risk
Expected Spend	$575	$2,692	$4,888	$14,037
Actual Spend	$356	$1,901	$4,376	$12,900
Savings Per User	$219	$791	$512	$1,137
User Members	6,581	1,977	2,275	1,316
User Savings %	38.0%	29.4%	10.5%	8.1%
Total Cohort Savings ($)	$1,439K	$1,564K	$1,165K	$1,496K

Figure 1. Example output for client-based risk-adjusted savings analysis

Aggregating the Results Across Clients

To assess the overall impact of engagement with the care navigation platform on total medical spend, we calculated the PMPY user savings for that client and then assessed the overall percent savings as a function of the total expected spend. We then aggregated the savings in two ways: as the median average user PMPY savings and as the median percent savings across clients included in the analysis. The client was used as the aggregate unit to reduce bias introduced by client-based differences in platform configuration, employee population, and health benefit design.

Results

Population Characteristics

The summary of population characteristics included in the initial analysis is shown in Table 2. In 2019, across the 2.7M users, approximately 21% (570K) qualify as users for the subsequent analyses. In 2020, across the 2.5M users, approximately 27% (654K) qualify as users for the subsequent analyses. In both 2019 and 2020, users are significantly older than non-users (45 years vs 30 years) with a slightly lower

proportion of females (47% for users vs 50% for non-users). The risk profiles for the non-user and user members are similar, with the majority of members in the very low risk cohort across both groups (43% for users vs 58% for non-users).

Table 2a. Characteristics of Eligible Members included in the analysis (2019)

	Non-Users			Users		
	n	%	mean	n	%	mean
# of Clients	73			73		
Sample Size	2,138,561	79%	29,295	569,640	21%	7,803
Age			31			45
% Female			50%			47%
Risk Score						
Very Low Risk	1,241,113	58%	0.16	245,773	43%	0.19
Low Risk	363,075	17%	0.71	111,434	20%	0.72
Medium Risk	321,363	15%	1.56	124,402	22%	1.57
High Risk	173,272	8%	4.02	73,659	13%	4.06
Very High Risk	39,608	2%	18.15	14,251	3%	15.74

Table 2b. Characteristics of Eligible Members included in the analysis (2020)

	Non-Users			Users		
	n	%	mean	n	%	mean
# of Clients	48			48		
Sample Size	1,813,988	73%	37,791	654,256	27%	13,630
Age			31			45
% Female			50%			47%
Risk Score						
Very Low Risk	1,095,404	60%	0.16	299,537	46%	0.19
Low Risk	296,986	16%	0.71	129,550	20%	0.72
Medium Risk	253,280	14%	1.56	134,381	21%	1.56
High Risk	136,447	8%	4.02	76,502	12%	4.03
Very High Risk	31,870	2%	18.34	14,286	2%	16.08

Impact of Platform Engagement on Total Medical Spend

The savings for users engaging with the Castlight platform is shown in Table 3. As shown in Table 3a, in 2019, for our 73 clients (~2.7 million members), across the four risk cohorts, median average savings in total annual medical spend ranges from $101 (15.5%) for Very Low Risk users to $253 (1.8%) for High Risk users, resulting in a median average user PMPY savings across all clients of $149 (5.3%). In 2020, as shown in Table 3b, for our 48 clients (~2.5 million members), across the four risk cohorts, median average savings in total annual medical spend ranges from $84 (14.5%) for Very Low Risk users to $322 (6.8%) for Medium Risk users, resulting in a median average user PMPY savings across all clients of $165 (5.5%)

The savings for our highest engaged clients is shown in Table 4. Among those clients with the highest levels of user engagement with the platform (20 clients, 500,000 members) in 2019, median average savings in total annual medical spend ranges from $120 (18.8%) for Very Low Risk to $437 (2.8%) for High Risk, resulting in a median average user PMPY savings across all clients of $237 (6.3%). In 2020, clients with the highest levels of user engagement with the platform (11 clients, 400,000 members), median average savings in total annual medical spend ranges from $29 (0.2%) for High Risk to $532 (10.3%) for Medium Risk, resulting in a median average user PMPY savings across all clients of $205 (6.3%)

Table 3a. Summary of Results - Aggregate Savings across all clients (2019)

	Very Low Risk	Low Risk	Medium Risk	High Risk	Total
Total User Members	245,806	111,305	124,383	73,452	554,946
Median User Members	959	505	532	317	2,300
Median Savings/User	$101	$268	$344	$253	$149
Median User % Savings	15.50%	12.10%	7.70%	1.80%	5.30%

Table 3b. Summary of Results - Aggregate Savings across all clients (2020)

	Very Low Risk	Low Risk	Medium Risk	High Risk	Total
Total User Members	299,530	129,540	134,282	75,838	639,190
Median User Members	2,680	1,187	1,306	740	5,890
Median Savings/User	$84	$194	$322	$274	$165
Median User % Savings	14.50%	10.10%	6.8%	2.0%	5.50%

Table 4a. Summary of Results - Aggregate Savings across engaged clients (2019)

	Very Low Risk	Low Risk	Medium Risk	High Risk	Total
Total User Members	87,332	36,653	38,618	22,372	184,975
Median User Members	2,602	1,053	1,179	635	5,383
Median Savings/User	$120	$344	$555	$437	$237
Median User % Savings	18.80%	13.00%	9.40%	2.80%	6.30%

Table 4b. Summary of Results - Aggregate Savings across engaged clients (2020)

	Very Low Risk	Low Risk	Medium Risk	High Risk	Total
Total User Members	77,358	31,851	32,842	18,315	160,366
Median User Members	6,789	2,619	2,689	1,335	14,551
Median Savings/User	$84	$355	$532	$29	$205
Median User % Savings	18.70%	16.20%	10.3%	0.2%	6.30%

Impact of Platform Engagement on Specific Subpopulations

The aggregate median savings for users engaging with the Castlight platform in low back pain subpopulations is shown in Table 5. In 2019, for members meeting criteria to be considered at risk for low back pain (~180,000 members), across the four risk cohorts (Table 5a), user savings in total annual medical spend ranges from $43

(2.8%) for very low risk to $338 (2.2%) for high risk, resulting in a median average PMPY savings across all clients of $117 (2.0%). As shown in Table 5b, in 2020, for members meeting criteria to be considered at risk for low back pain (~40,000 members), across the four risk cohorts, user savings in total annual medical spend ranges from $50 (7.9%) for very low risk to $619 (3.9%) for high risk, resulting in a median average PMPY savings across all clients of $422 (10.5%).

Table 5a. Summary of Results - Lower Back Pain Subpopulation (2019)

	Very Low Risk	Low Risk	Medium Risk	High Risk	Total
Total User Members	16,773	18,326	25,281	14,329	74,709
Median User Members	221	236	381	301	994
Median Savings/User	$43	$77	$78	$338	$117
Median User % Savings	2.80%	3.70%	1.70%	2.20%	2.00%

Table 5b. Summary of Results - Lower Back Pain Subpopulation (2020)

	Very Low Risk	Low Risk	Medium Risk	High Risk	Total
Total User Members	7,978	5,128	5,123	2,449	20,678
Median User Members	124	87	94	37	341
Median Savings/User	$37	$138	$2	$192	$73

Median User % Savings	5.1%	6.6%	0.1%	1.3%	2.90%

Discussion

This study highlights four primary findings that demonstrate the impact Castlight's personalized healthcare navigation platform has on total healthcare spend: 1) members who engage with the Castlight platform experience considerable savings in medical spend as compared to eligible members who do not engage with the platform, 2) clients whose member populations are highly engaged with the platform experience greater savings in medical spend, and 3) members in subpopulations at risk for high healthcare spend, such as those with high-risk pregnancy and low back pain, who engage with the platform experience reduced total medical spend.

Castlight Impact on Overall Total Medical Spend

The reduction of $149 (5.3%) and $165 (5.5%) for members who engaged with the Castlight platform represents significant savings in total medical spend. The PMPY user savings are highest for the Very Low, Low and Medium Risk cohorts, indicating that these members are more amenable to the platform's care navigation features. Additionally, clients with higher platform engagement across eligible member populations experience a higher savings in total medical spend, a 30% increase in PMPY savings for the Medium Risk cohort for our highest engaged clients in both 2019 and 2020..

Castlight Impact on Subpopulation Total Medical Spend

Subpopulations at risk for higher healthcare spend, such as those with low back pain, also benefit from the personalized healthcare journey provided by Castlight's digital

platform. Navigation features for these subpopulations include proactive outreach to provide condition-specific information, steerage to appropriate sites of care, assessments of provider quality and experience in treating these conditions, and recommendations for available health benefit programming specific to these conditions. The reduction in total medical spend for users in these subpopulations—up to 2.9% for low back pain —reflects the impact of this personalized experience.

Limitations of this analysis include any inherent bias introduced due non-matched user and non-user segments within each risk cohort.

Conclusion

As more employers adopt digital solutions to help direct employees toward high-value care, it becomes increasingly important to measure the impact in terms of medical spending. This study demonstrates how Castlight's risk-adjusted savings model can enable employers to assess the value of their healthcare investments. Our results suggest that user engagement with the platform reduces total medical spend, with increased use corresponding with greater savings.

Future research will identify specific aspects of user engagement with the platform (such as feature utilization) that drive savings.

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