sword | thrive

Reducing Surgical Rates and Improving Member Lives While Delivering a 4.7:1 ROI

Executive Summary

Sword Health commissioned **Milliman to independently review the ROI methodology used in this study.** Musculoskeletal (MSK) conditions are among the largest and most complex cost drivers for Medicare Advantage (MA) plans. This study, involving a sample of **836 Thrive members and 836 controls**, demonstrates a clinically proven and scalable alternative that reduces direct MSK spend while improving member outcomes.

Across Sword Health's MA book of business, Thrive, our AI Care solution that focuses on physical therapy, delivered significant, claims-validated savings using a rigorous propensity score–matched cohort and a difference-in-difference (DiD) methodology.

The results show a decisive shift away from avoidable surgery and toward effective, conservative care, translating into meaningful savings and improved member experience.

Seniors show higher start and completion rates, greater engagement, and more interaction than younger adults. They also report higher satisfaction, even though they require more technical support. Importantly, clinical outcomes such as pain reduction remain comparable across age groups.

Members aged 65+ engage deeply with the program, averaging **33 sessions** and completing at a higher rate than those under 65.

A published clinical study confirms this trend, showing seniors are more likely to start, complete more sessions, and finish the program at higher rates, all while maintaining strong satisfaction (9/10) and comparable clinical outcomes.

Headline Results (PMPY):

4.7:1 Gross ROI on MSK Spend

$3,770 Reduction in MSK Spend

132 Fewer Surgical Encounters per 1,000 members (driving **$2,715 of savings** from surgery reduction)

You're doing great, Mary!

The Medicare Advantage MSK Challenge

For MA populations, MSK conditions touch as many as one in two members[1], making them pervasive and persistently costly. MSK care can account for up to 15% of total cost of care, and members with an MSK diagnosis may average **>$2,940 per year[2].**

Traditional care pathways often escalate from imaging to specialist visits and ultimately to surgery, even when conservative alternatives would suffice.

The result is a high-cost trajectory that fails many older adults, especially when travel and scheduling constraints hinder adherence to in-person physical therapy.

Why the Status Quo Underperforms:

- Fragmented pathways default to invasive care without sustained conservative management.
- Access and adherence barriers prevent consistent therapy attendance and completion.
- Invasive procedures amplify spending, member burden, and recovery time.

Key Findings: Shifting the Care Pathway

The program reoriented utilization away from high-cost, low-value endpoints and toward the right conservative care at the right time. This clinical redirection produced both surgical avoidance and sustainable savings.

Utilization and Spend Reductions (per member, Differences in Differences):

Surgery
$2,715 savings, driven by 110 fewer encounters (61% reduction)

Rehab & Therapy
$529 savings, with 4,268 fewer visits (82% reduction)

Other MSK Procedures
$206 savings, with 241 fewer services (48% reduction)

Office Visits
$130 savings, with 248 fewer visits (27% reduction)

Emergency Room
$190 savings, with 4 fewer encounters (51% reduction)

> Together, these shifts generated
>
> $**3,770** PMPY
>
> in direct MSK savings.

Member Value and Engagement

Clinical and financial results were powered by strong member engagement and real, measurable improvements in function. With Thrive's AI Care model, members avoid the friction of travel or waiting rooms, while personalized plans and coaching from Doctors of Physical Therapy keep them motivated and on track.

- Seniors complete an average of **33 sessions** and complete the program at a rate 11% higher than those under 65
- Members report meaningful reductions in pain and improvements in daily function, which supports independence and quality of life

What enables sustained engagement:

- Frictionless access (home-based, on-demand sessions)
- Personalized progression with real-time feedback
- Personalized support and accountability that foster completion

2. Gupta, A., & Frey-Law, L. A. (2024). Editorial: Insight in musculoskeletal pain—2023. Frontiers in Pain Research, 5, Article 1411879. https://doi.org/10.3389/fpain.2024.1411879
3. Based on Sword's internal claims analysis

Spotlight on the 65+ Population

Seniors represent a distinct opportunity for MA plans because they not only engage deeply but also finish at higher rates, achieving outcomes on par with younger adults. In Sword's book of business[3]:

- **~8% of Sword members are 65+**
- Seniors complete sessions at higher rates, with **9/10 satisfaction**
- **67% complete the program free of limiting pain[4]**
- 64% report no significant activity limitations[5]
- Mental Health improvements are similarly notable, with 64% rescued from moderate-to-severe anxiety and 60% from moderate-to-severe depression.

Return on Investment

The financial case for Thrive is compelling and claims-validated. On a per-member-per-year basis, the program delivers **$3,770** in **direct MSK savings**. With a maximum average member fee of $799 PMPY, plans realize a **4.7:1 gross ROI**, every dollar invested returns $4.70 in gross MSK savings.

ROI components (PMPY):

$**3,770**   Gross MSK Savings

$**799**   Max Capped Program Fee

4.7:1   Gross MSK ROI
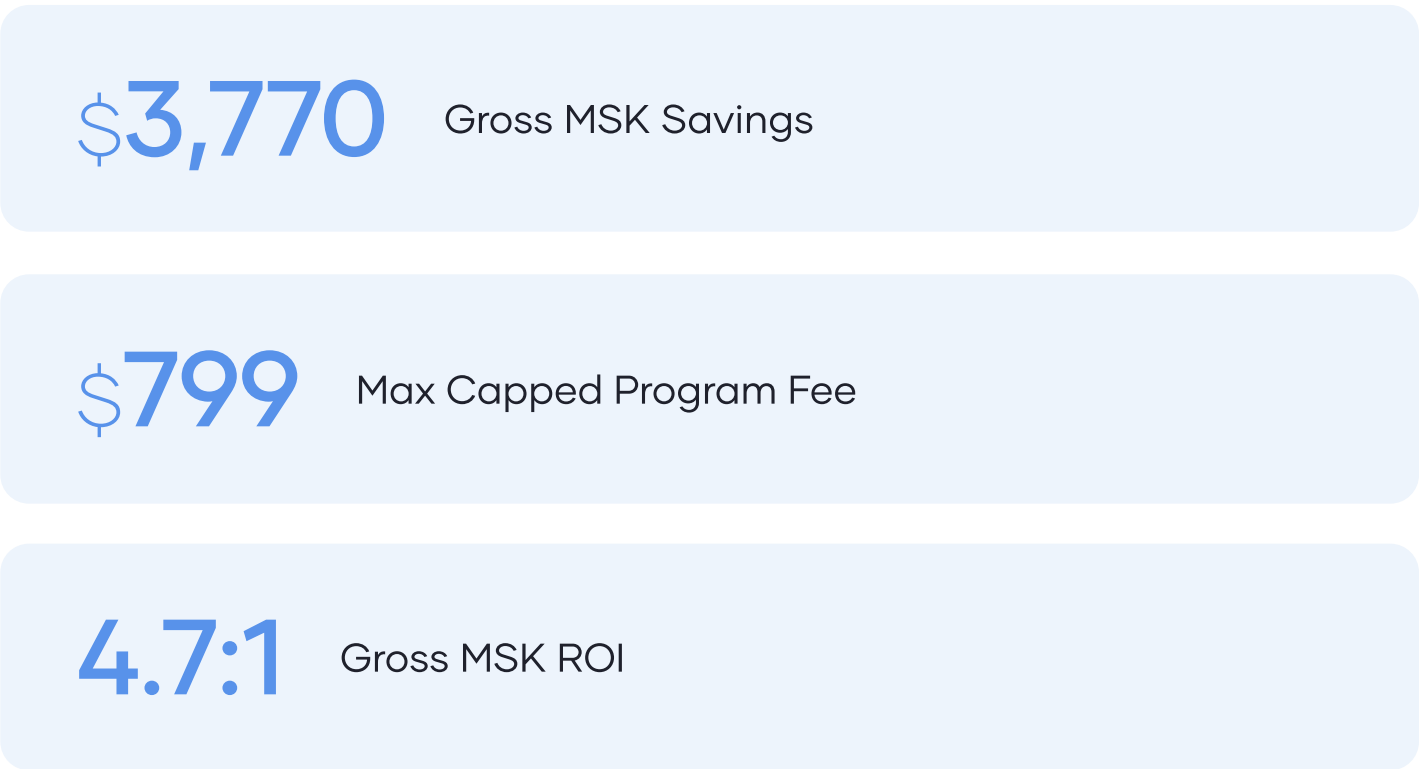
Study Design and Methods

The analysis behind these findings used rigorous statistical methods to ensure reliability and isolate Thrive's impact on medical claims.

Study Design: the study employed a retrospective cohort analysis of **836 Sword Thrive members and 836 matched controls** who received only traditional care.

Inclusion Criteria:

To be included, participants had to:

- Be 65 years or older
- Have continuous medical eligibility for at least 6 to 12+ months pre- and 6 to 12+ months post-index date
- Thrive participants had to complete at least one Thrive session
- Controls were required to have at least one MSK claim and evidence of traditional physical therapy care

Data Sources:

Medical claims data and eligibility records, linked to Sword program data, spanning **July 2022 to February 2025** were used to identify study participants.

Propensity Score Matching (PSM):

To ensure comparability, propensity score matching was used to construct balanced treatment and control groups.

- Matching was based on **81 covariates** covering demographics, MSK history, surgery, physical therapy, baseline spend/utilization, and comorbidities (including diabetes, cardiovascular, mental health, obesity, and other chronic conditions).
- The algorithm employed a logistic regression (glm) distance measure, nearest neighbour matching without replacement within a defined caliper, and exact matching on gender and eligibility period.

4. Source: Sword member base, up until October 24 2020-2024 data, 9.8k thrive members with outcomes
5. "Free of limiting pain" = enrolled with moderate-to-severe pain and, by program end, reporting no/only mild pain or ≥30% reduction.
6. "No significant activity limitations" = enrolled with significant limitations and, by program end, no longer reporting significant limitations.

- This ensured that participants and controls were statistically similar at baseline, reducing confounding bias.

Difference-in-Difference (DiD) Analysis:

A DiD approach was applied to measure changes in spend and utilization over time between the Thrive and control groups. This method isolates program impact by:

- Comparing pre- and post-index changes in both groups
- Accounting for underlying time trends and external factors affecting both groups equally
- Ensuring that observed differences reflect the causal effect of Thrive participation

Baseline Balance:

A comprehensive balance table was used to verify statistical comparability between groups. All absolute standardized mean differences (SMDs) were below 0.1, indicating high-quality matching.

Outcome Measurement:

Claims-validated outcomes were tracked over time, including total MSK spend, surgeries, imaging, ER, therapy, and office visits. Savings estimates were based on these differences and then extrapolated annually based on the available months of healthcare eligibility (6 to 12 months before and after the index event each), ensuring real-world impact is attributed to Thrive.

Conclusion: A Strategic Imperative for Medicare Advantage

Thrive is more than an MSK solution; it is a practical lever to achieve core MA objectives. By shifting care upstream; away from avoidable surgery and toward effective conservative management, plans reduce MSK trend, restore function, and elevate member experience.

The claims-validated savings, paired with reliable engagement and completion among seniors, make a strong case for inclusion in benefit design today.

For MA plans seeking measurable value, member-centered care, and operational scalability, Thrive offers a proven path to better outcomes at lower total cost of care.

Appendix

MSK-Specific PMPM Spend in the Post-Period for Sword Health Versus Control Group

Service Category	Sword Group	Control Group	Difference	P-value
Surgery	$68.0	$288.0	$220.0	<0.0001
Office	$22.8	$38.7	$15.9	<0.0001
ER	$2.1	$20.1	$18.0	0.23
Imaging	$6.7	$13.4	$6.7	<0.0001
Rehab & Therapy	$7.2	$52.8	$45.6	<0.0001
Total	**$107.0**	**$413.0**	**$306.0**	

MSK-Specific Service Utilization (per 1k Beneficiaries) in the Post-Period for Sword Health Versus Control Group

Service Category	Sword Group	Control Group	Difference	P-value
Surgery	63	160	97	<0.0001
Rehab & Therapy	968	5,332	4,364	<0.0001
Office	1,271	1,730	459	<0.0001
Imaging	607	933	326	<0.0001
ER	40	81	41	<0.0001

Balance Measures

We evaluated covariate balance between treatment and control groups using standardized mean differences. A difference of less than 0.1 indicates acceptable balance.

Balance Metrics

Variable	Type	Diff. Adj	Threshold
Age	Continuous	0.0174	Balanced (<0.1)
MSK Pre-Spend	Continuous	-0.0052	Balanced (<0.1)
MSK Pre-Visits	Continuous	0.0066	Balanced (<0.1)
PT Pre-Spend	Continuous	-0.0108	Balanced (<0.1)
PT Pre-Visits	Continuous	-0.0088	Balanced (<0.1)
TCOC Pre-Spend	Continuous	0.0317	Balanced (<0.1)
TCOC Pre-Visits	Continuous	0.0469	Balanced (<0.1)
Surgery Match Pre-Spend	Continuous	-0.0122	Balanced (<0.1)
Surgery Match Pre-Visits	Continuous	0.0440	Balanced (<0.1)
Diagnosis Hypertension	Binary	-0.0215	Balanced (<0.1)
Diagnosis Heart	Binary	0.0132	Balanced (<0.1)
Diagnosis Diabetes	Binary	-0.0120	Balanced (<0.1)
Diagnosis Obesity	Binary	0.0024	Balanced (<0.1)
Diagnosis MentalHealth	Binary	0.0000	Balanced (<0.1)
Diagnosis SubstanceUse	Binary	0.0000	Balanced (<0.1)
Diagnosis Autoimmune	Binary	-0.0048	Balanced (<0.1)
Diagnosis Neuro	Binary	0.0024	Balanced (<0.1)
Diagnosis Respiratory	Binary	0.0036	Balanced (<0.1)
Diagnosis HIV	Binary	0.0000	Balanced (<0.1)

Variable	Type	Diff. Adj	Threshold
Diagnosis Osteomyelitis	Binary	0.0024	Balanced (<0.1)
Hypertension Pre-Spend	Continuous	-0.0252	Balanced (<0.1)
Heart Pre-Spend	Continuous	0.0824	Balanced (<0.1)
Diabetes Pre-Spend	Continuous	-0.0077	Balanced (<0.1)
Obesity Pre-Spend	Continuous	0.0753	Balanced (<0.1)
Autoimmune Pre-Spend	Continuous	0.0443	Balanced (<0.1)
Neuro Pre-Spend	Continuous	0.0149	Balanced (<0.1)
Respiratory Pre-Spend	Continuous	0.0058	Balanced (<0.1)
HIV Pre-Spend	Continuous	0.0116	Balanced (<0.1)
Osteomyelitis Pre-Spend	Continuous	0.0338	Balanced (<0.1)
State indicators (AK–WY)	Binary	Range: -0.0167 to 0.0395	Balanced (<0.1)
Care Progression Indicators	Binary	Range: -0.0096 to 0.0144	Balanced (<0.1)
Pre-Member Months	Continuous	0.0086	Balanced (<0.1)
MSK Index Event Conditions	Binary	0.0000	Balanced (<0.1)
Member Gender (F/M/U)	Binary	0.0000	Balanced (<0.1)

Balance Summary

Balanced variables (<0.1): 104

Not balanced (>0.1): 0

All covariates meet the pre-specified threshold for balance, ensuring strong comparability between treatment and control cohorts.

Sample Sizes

Group	Control	Treated
All	161,200	840
Matched	836	836
Unmatched	160,364	4

The final analytic sample included **836 matched pairs.**