

# Hinge Health: ROI calculation methodology

## Background

This document outlines how Hinge Health would measure the ROI of the Hinge Health program based on cost avoidance, mainly by avoiding surgeries.

## ROI calculation

Hinge Health guarantees a 1.5x ROI to the Employer. Cost savings are assessed based on the reduction of pain as measured by the visual analog scale (VAS), before and after participating in the Hinge Health intensive 12-week phase.

To achieve a 1.5:1 ROI, the following calculated value needs to be 1.5x the cost of the program:

$$\left[ \frac{(\text{Pain at screening}) - (\text{Pain at 12 weeks})}{(\text{Pain at screening})} \times 100 \right] \times \$71.09^* \times \text{number of participants}$$
  
= total cost saved

\*Based on our published clinical studies Hinge Health saves \$71.09 in musculoskeletal (“MSK”) costs per participant per year for every 1% decrease in pain

Example: By way of example, assume 1000 participants go through the program the total cost would be \$995,000 (calculated by 1000 participants multiplied by \$995). The expected savings at 1.5x ROI would be  $\$995,000 \times 1.5 = \$1,492,500$ . If the average pain is reduced by 10% from a screening value of 90/100 down to 81/100 by 12 weeks then the savings would be:

$$\left( \frac{90-81}{90} \right) \times 100 \times \$71.09 \times 1000 \text{ participants} = \$710,900$$
. Thus the Program did not achieve the guaranteed 1.5x ROI.

## Validation of calculation method

Quantifying cost avoidance is always challenging - it is hard to prove something did not happen that would have otherwise happened. However, in this case, there are a number of reasons why pain reduction is a metric with robust predictive power for total MSK spend reduction. Below are outcomes from 3 cost analysis studies.

**Randomized Control Trial Clinical Study #1 (2015-2018):**<sup>1</sup> In a peer-reviewed randomized control study with researchers from Stanford, with 101 Hinge Health participants with chronic knee pain considering surgery, the average pain reduction for each participant was 61%. Hinge Health avoided \$438,000 in surgeries which is an average of \$4336.63 saved per participant or \$71.09 per 1% pain reduction.

**Employer Medical Claims Study #2 (2016-2019):**<sup>2</sup> In this medical claims analysis for a 30,000+ employee technology industry company, we analyzed the total MSK spend for a cohort of 431 participants after completing the Hinge Health program. Total MSK medical claims declined



\$1,949,641.43 and participants reported an average 58% pain reduction. That is an average of \$4,523.53 saved per participant, which is an average of \$77.99 per 1% pain reduction.

**10,264 Participant Longitudinal Study #4 (2020):**<sup>3</sup> In May 2020, Hinge Health published a 4th peer-reviewed clinical study in conjunction with researchers from Stanford, Vanderbilt and the University of California San Francisco showing the correlation between our pain reduction and surgery reduction. Across 10,264 participants, we saw an average pain reduction of 67.42% and \$51,448,518.00 saved in MSK spend based on a 67.3% reduction in 1 year surgery likelihood. Averaging \$5,012.52 saved per participant, which is an average of \$73.23 saved per participant per 1% pain reduction

1 [Mecklenburg, et al. \(2018\) Effects of a Digital Care Program \(Knee\). JMIR](#)

2 [Hinge Health \(2020\) Employer medical claims analysis](#)

3 [Bailey, J., et al. \(2020\) Digital Care for Chronic Musculoskeletal Pain: 10,000 Participant Longitudinal Cohort Study. JMIR.](#)