



Exploring the Hidden Costs of Depression: How Twill Can Provide Solutions to Address this Burden

Executive Summary

The Hidden Costs of Unrecognized and Untreated Depression

The estimated prevalence of depression is 40% among Americans, with nearly half (17%) of these people not realizing they are experiencing symptoms (“unrecognized depression”). Severity of symptoms from depression and anxiety drive a significant burden, with unrecognized depression resulting in a 149% and 127% increase in medical and productivity loss costs relative to no depression.¹

Once diagnosed, around 43% of people do not initiate treatment within a year. Several barriers related to financial access, provider shortages, mental health literacy, and stigma can result in delayed care.²

These delays in care can place a huge burden on the system, with costs being 2x higher for people who delay care by a year.³

How Can Twill Provide Solutions to Address This Burden?

Twill accelerates the delivery of digital-led care by weaving together simpler, more comprehensive and connected support, engaging people wherever they are in their care journey. We're able to accomplish this by:

1. Finding and activating hard to reach patient populations earlier
2. Engaging and guiding patients to the right content and resources
3. Driving the most impactful behaviors

Twill could drive cost savings by improving depression symptom severity and providing solutions that could result in earlier care.

In this white paper, you'll find an in-depth analysis of:

- Current research on the prevalence of unrecognized and untreated depression in the United States and the economic burden that arises from it
- Analysis on depression symptom severity driving poor outcomes, with co-occurring anxiety symptoms exacerbating costs, as well as the economic impact of delaying care
- Economics of using Twill products at a population level from a payor and employer perspective to drive cost savings by reducing symptom severity and providing solutions that could result in earlier care



The Hidden Costs of Unrecognized and Untreated Depression

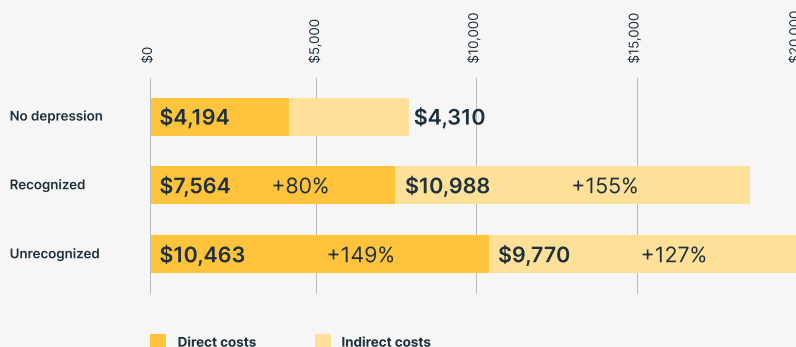
Nearly half of those with depression symptoms do not realize they are experiencing them (unrecognized depression), driving significant hidden costs.

Prevalence of Depression Symptoms

The national prevalence of depression symptoms is **40%**, of which **17%** experience unrecognized depression symptoms (i.e., they do not self-report experiencing depression symptoms but have mild to severe symptoms based on the PHQ-9).¹ Of this group, 64% also experience **mild to severe anxiety symptoms**.

Other comorbid chronic conditions also add to the burden among people with unrecognized depression.¹ People with chronic conditions have a high prevalence of depression symptoms, with estimates ranging from 30% to 50%.

Incremental Costs of Depression



Recognized depression: People who reported having experienced symptoms of depression within the last 12 months

No depression: People who said they had not experienced symptoms of depression within the last 12 months and their PHQ-9 assessment showed no symptoms of depression

Unrecognized depression: People who said they had not experienced symptoms of depression within the last 12 months, but their PHQ-9 assessment showed symptoms of mild to severe depression (PHQ > 4)

The Economic Impact of Unrecognized Depression



+149% Average Annual Medical Costs¹

Average annual medical costs for individuals with unrecognized depression total **\$10,463**, 149% higher than for individuals with no depression symptoms.

+127% Average Indirect Costs¹

Average indirect costs total **\$9,770**, 127% higher than for individuals with no depression symptoms.

Why might depression go unrecognized?²

Lack of mental health literacy

This can lead to an inability to recognize signs of illness or perceive the need for care

Stigma attached to seeking help for mental illnesses

Social stigma and a lack of culturally-sensitive mental health awareness programs limit the scope of early identification

Providers can overlook diagnoses

Time constraints during appointments, and limited resources and guidelines for screening

Financial access

Costly care and lack of or inadequate insurance coverage may deter individuals from seeking care

Depression symptom severity drives poor outcomes, with co-occurring anxiety symptoms exacerbating costs.

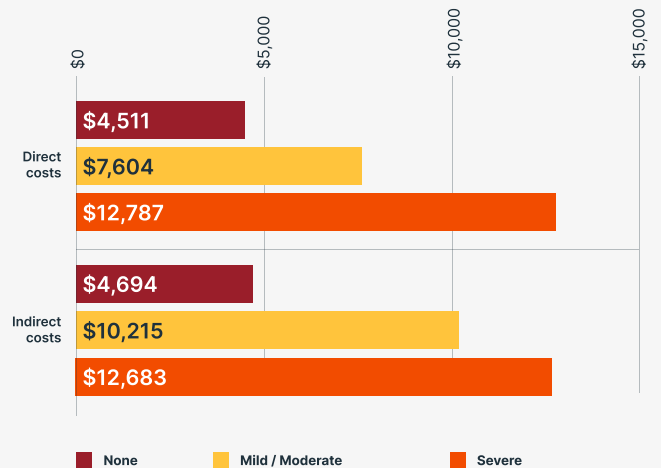
Depression Symptom Severity and Costs

Depression symptom severity drives both direct and indirect costs higher for individuals with recognized and unrecognized depression.

Our analysis found that severity of depression symptoms drives worse outcomes. Individuals with more severe depression symptoms experience lower quality of life, and higher annual medical costs than those with no symptoms.

In addition, individuals with depression symptoms experience more absenteeism and presenteeism than those with no symptoms. These productivity losses translate into high costs for employers.

Cost of Depression by Symptom Severity⁴



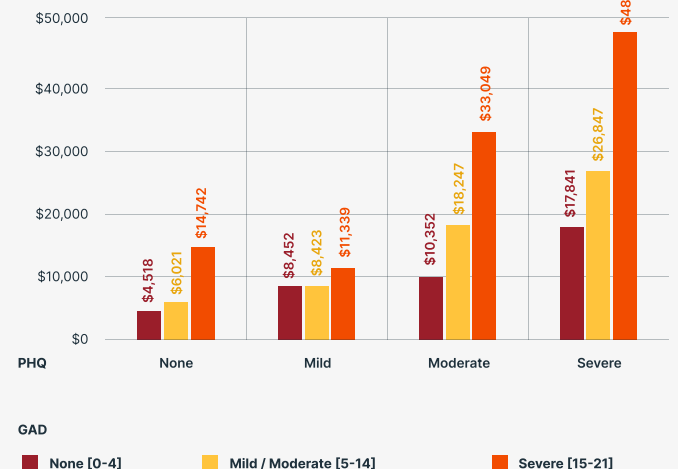
The Impact of Comorbid Anxiety

Anxiety symptoms often co-occur with depression symptoms, which may drive costs higher for individuals experiencing depression with comorbid anxiety.

Anxiety symptoms often co-occur with depression, which may drive costs even higher for individuals experiencing both depression and anxiety symptoms.

Given the high prevalence of comorbid anxiety and depression symptoms, these additional costs present a significant burden at a population level.

Direct Cost of Depression by Anxiety Symptom Severity⁴



Forty-three percent of people who receive a diagnosis of depression remain untreated at one year. Delaying care can result in 2x higher healthcare costs over one year.

Economic Impact of Delayed Treatment

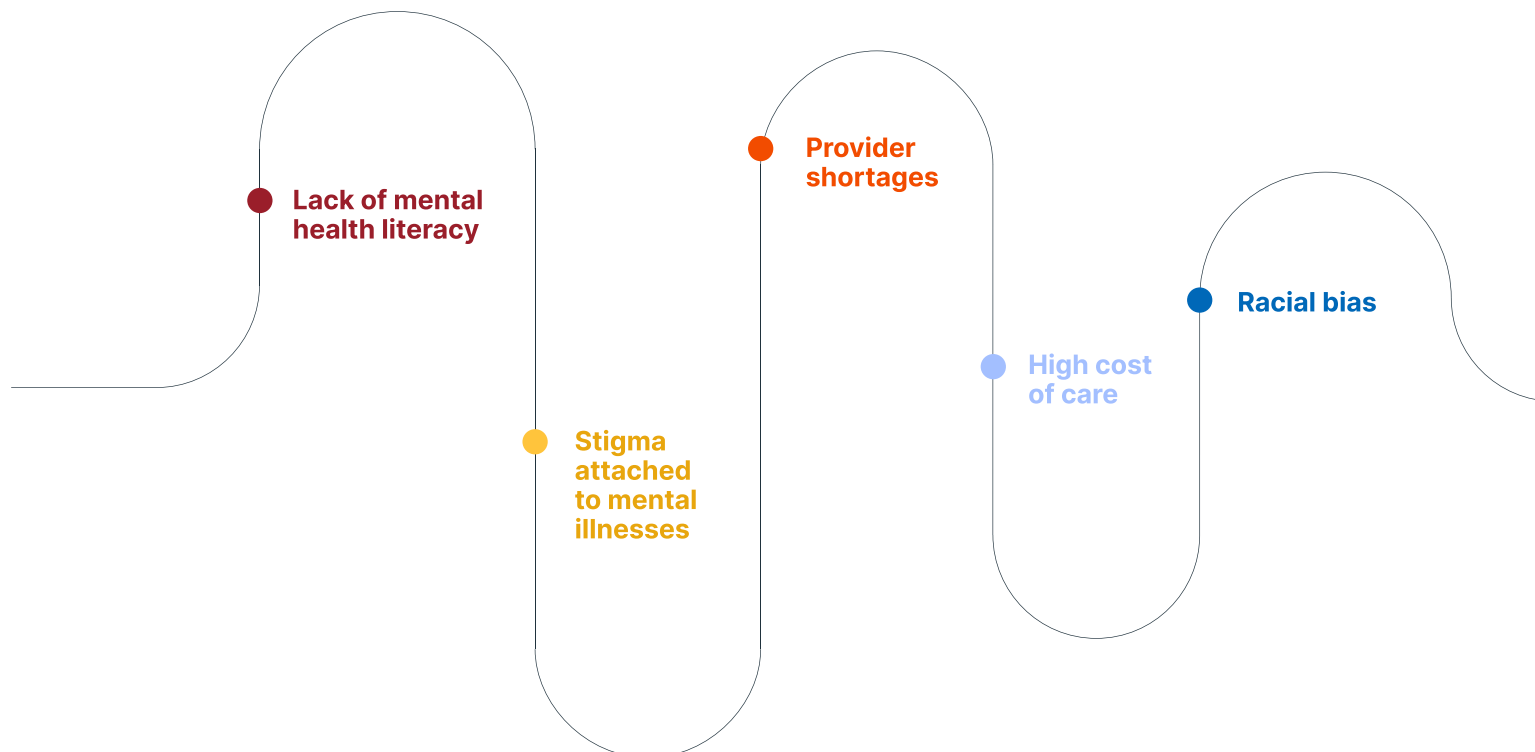
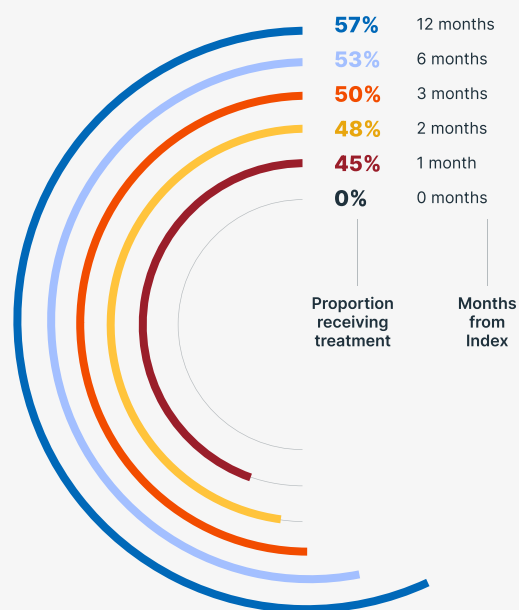
A substantial portion of people with Major Depressive Disorder (MDD) do not have a treatment claim within one year of their diagnosis. Untreated depression often co-occurs with anxiety (46%).⁵

To better understand the treatment patterns of individuals with a new depression diagnosis and to quantify the economic impact of treatment, we analyzed adults in the United States with a new diagnosis of major MDD. Additional details on this research can be found [here](#).⁵

Prevalence of Delayed Care

After a new MDD diagnosis, 43% of individuals remained untreated 12 months after their diagnosis. Comorbid anxiety is highly prevalent (46%) among people with newly diagnosed MDD.⁵ Reasons that individuals may delay getting care include:²

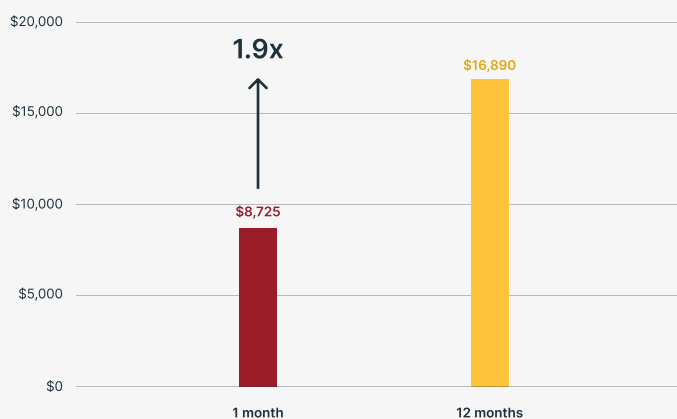
% of Individuals Who Started Treatment Following a New Depression Diagnosis



Analysis of Incremental Medical Costs

A one-year delay in care post-MDD diagnosis results in 2x higher healthcare charges relative to people who received earlier care. Anxiety significantly increases the likelihood of increased charges among people with untreated depression.³

Annual Healthcare Costs for Individuals Treated for Depression at Different Time Points



*Treatment claims could be underestimated since we may not be capturing all claims for treatment (e.g., if someone went to provider doesn't take insurance this claim may not be captured in claims database)


Resulting Burden From a One-Year Delay in Care

+\$8,165

Incremental Annual Medical Cost³

An internal analysis revealed that incremental annual medical cost for individuals with depression who are treated from 6-12 months vs. those treated within 1 month was \$8,165.

Presence of co-morbid anxiety increases the expected costs among those with untreated depression population by 29%.³



How Twill Can Improve Outcomes And Reduce The Burden of Depression

In this white paper, we've uncovered the hidden cost of unrecognized and untreated depression. So, how can we help? Through engaging employees and members by weaving together simpler, more connected and comprehensive digital-led care, Twill could drive cost savings by improving depression symptom severity and providing solutions that could result in earlier depression treatment.

Accelerating the Delivery of Digital-Led Care

Whilst three in four of your employees will start their healthcare journey online (through a Google search, a visit to WebMD or Healthline, or, increasingly, social media platforms like Instagram and TikTok), only 9% of US employees have used an EAP resource.⁶

The problem isn't the available resources—it's getting employees to the available resources that are right for them. Doing this quicker not only improves an employee's well-being, resilience, and productivity, but also reduces costs. Twill accomplishes this by:

01

Finding and activating your employees

We bring a DTC lens and expertise to healthcare, tailored to your population and their needs.

Our deep expertise in activation has allowed the partners who follow our best practices to see an activation rate, on average, of **8% after six months**.⁷ (This is **four times** the impact compared to client partners who have chosen not to follow our best practices.)

02

Engaging and guiding members to relevant resources

By understanding each person's needs and preferences and guiding them to relevant content and resources (whether from your EAP resources, third party services, or our proprietary content library), we have seen **31% of Twill members stay active after 24 months**.

Our open configuration seamlessly transitions members between Twill and your own or third-party resources, allowing for improved triaging for member needs, as well as promoting awareness and accessibility to benefits. The ability to provide referral opportunities to other plan services helps Twill additionally identify comorbidities and social determinative health needs.

03

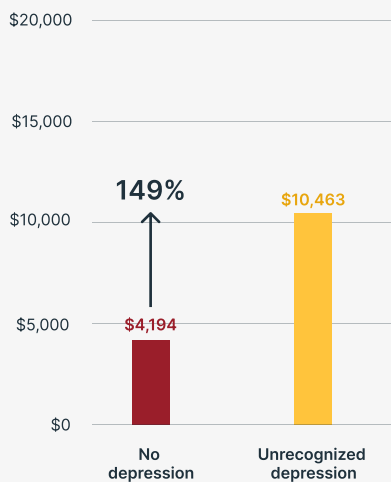
Driving the most impactful behaviors

Twill's approach encourages employees to adopt healthier behaviors. Our products are based on evidence-based drivers of behavior change to support employees' mental health and well-being. In addition, Twill puts employees in the best position to adopt healthier behaviors, such as becoming more adherent to their medications, changing their diet, or building better exercise or sleep habits.^{8, 9, 10}

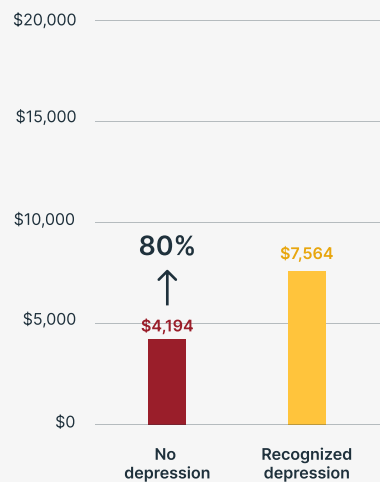
Twill's digital well-being and therapeutic products draw on therapeutic modalities with a strong record of improving depressive symptoms, including Cognitive Behavioral Therapy (CBT),¹¹ Positive Psychology,¹² and mindfulness.¹³

Incremental Costs From Symptom Recognition to Treatment

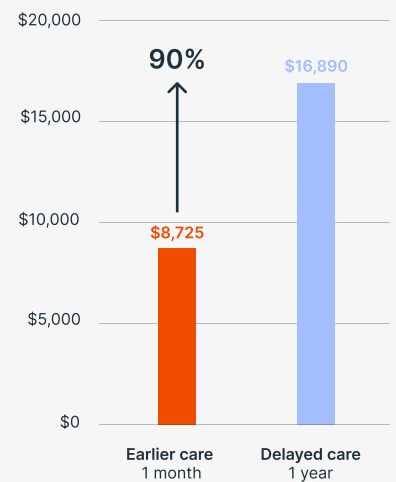
Unrecognized depression



Recognized depression



Untreated depression



Inadequate
wellness



Recognizing
depression symptoms



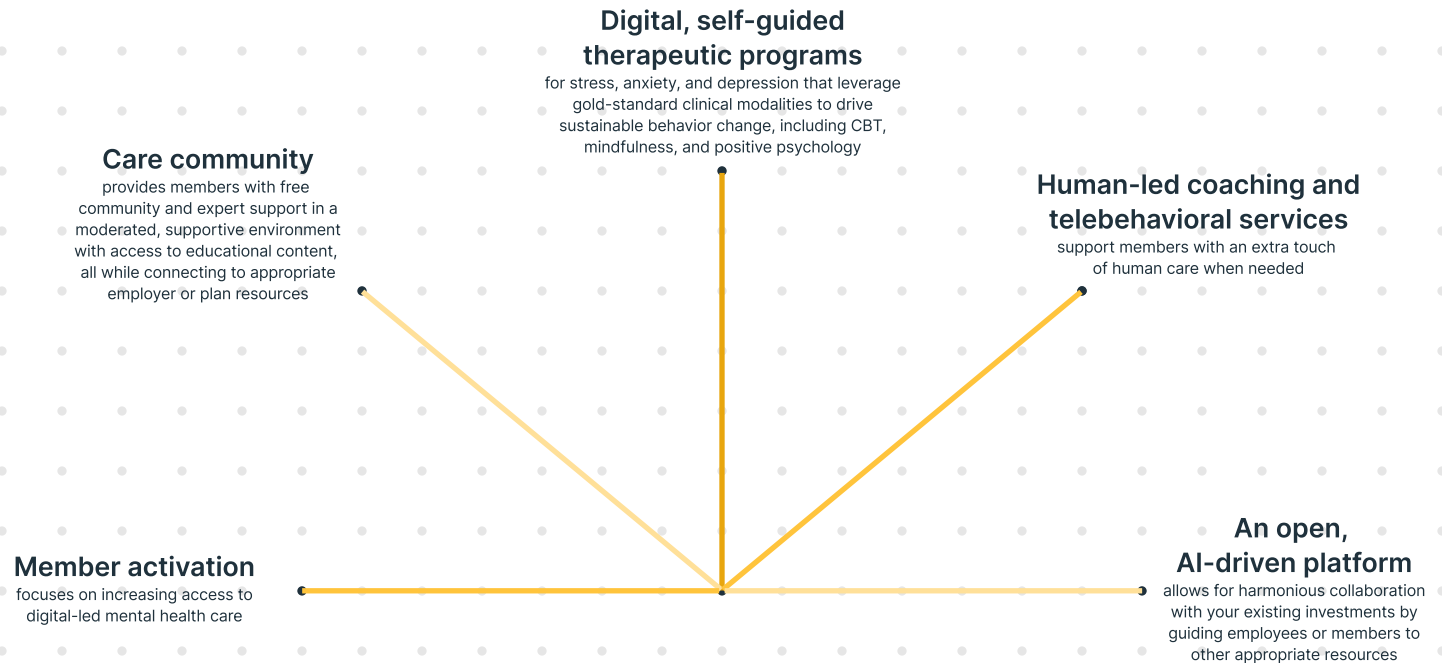
Diagnosing
depression



Initiating
treatment

How Twill Can Provide Solutions to Address this Burden

Twill's solution—what we call our **Mental Health Sequence**—weaves together digital-led mental health support. The Mental Health Sequence combines industry-leading digital care tools, scientifically designed to support well-being and address anxiety or depression via engaging, evidence-based interventions.



Delivered through one unified, configurable platform

The diagram shows three smartphone screens illustrating the Twill platform's capabilities:

- Brand Co. (Left):** Shows the Twill Therapeutics interface with modules for Basis and Happiness, designed to help with anxiety and depression. It includes a "View Track Collection" button and a "Browse All Tracks" link.
- Twill CARE (Middle):** Shows the Twill CARE interface with a "Top To-Dos" section, a "Today's Poll" about stress relief, and a "New Article" about negative emotions. It also features a "John's Feed" section with natural remedies and a "Feed" button.
- Brand Co. (Right):** Shows the Twill CARE interface with a "Services" section, a "Learning Center" link, and a "Duet Coaching" section. It includes a "ZacDac" section for finding in-person video visit providers and a "TeleDermatology" section for finding on-network providers.

Below the screens, the following text describes the services:

- Non-prescription software providing self-guided care for well-being**
- Free digital resource for employees online combining education, community, and expert support**
- Employer benefits for authenticated employees including both digital and human support**

Twill's Value: Clinical Evidence

Twill products have been shown to be effective in improving depressive symptoms, anxiety, subjective well-being, and resilience across a number of randomized controlled trials and retrospective analyses of real-world data.

Efficacy of Twill Products

Twill has more than 10 published studies demonstrating the efficacy of our products on mental health and well-being. Across studies, we've found that users who engage optimally (i.e., completing two or more activities per week) see significant improvements in depressive symptoms, anxiety, and well-being.

In one randomized controlled trial (RCT), the impact of a Twill product was compared against a psychoeducation control condition. Among participants who engaged optimally, we found a 25% improvement in both depressive symptoms and anxiety over 8 weeks, and a 21% improvement in resilience. These changes were significantly greater than those seen in the control group.¹⁴

The efficacy of Twill products has also been demonstrated in a number of different populations demonstrating the generalizability of these findings.

Twill products have demonstrated an average improvement of

25% to 27%

in depression, anxiety, and well-being symptoms for users who engage optimally

Value By Population

Racial Subgroups

Levels of engagement with Twill products, and improvements in well-being and anxiety related to using Twill products, was consistent across different racial/ethnic groups.¹⁵

Older Adults

While older adults (65+) may be less likely to use digital solutions than younger generations, they show similar improvements in well-being and anxiety when using Twill products.¹⁶

Chronic Conditions

Users with self-reported chronic conditions have lower levels of well-being overall, but improve at the same rate as those without chronic conditions while using Twill products.¹⁷ Specific analyses have demonstrated significant improvements in well-being and anxiety among Twill users with self-reported psoriasis, and cardiovascular disease risk factors (e.g., diabetes, high blood pressure or cholesterol) when engaging at the optimal level.^{18, 19}

Teens

Adolescents (13-17) using a tailored product for Teens show significant improvements in perceived stress, rumination, and loneliness.²⁰

Twill's Value: Economic Evidence

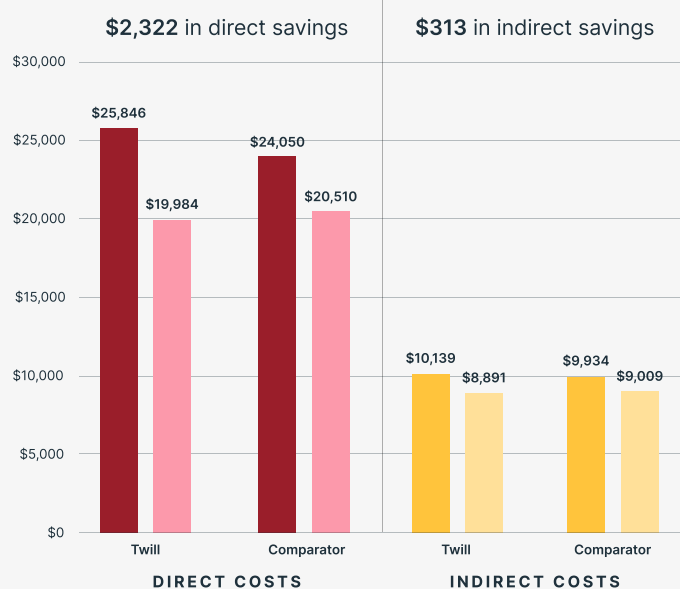
Twill's digital wellness product demonstrated cost-savings and cost-effectiveness relative to a sham control from a payor and employer perspective by improving symptom severity.

Budget Impact Model and Cost-Effectiveness²¹

Our ROI model demonstrated the impact of Twill products at a population level by leveraging efficacy data from a study which found that Twill users experienced improvements in depression and concurrent anxiety symptom severity levels. Using a difference-in-difference model, we estimated the change in costs from baseline to post-intervention for Twill relative to a sham control. We used data from the 2019 Cerner Enviza National Health and Wellness Survey (NHWS) to estimate direct medical costs and indirect productivity costs based on depression and concurrent anxiety severity levels for people with self-reported and unrecognized depression.* The change in costs (2021 USD) for each intervention were estimated using four depression-related health states (none, mild, moderate, severe), with a subdistribution of three anxiety levels (none, mild/moderate, severe) within each state.

Based on our analysis of the burden of depression at a population level, 34% of the population had mild to severe depression symptoms (50% self-report symptoms and 50% with unrecognized symptoms). The average direct and indirect cost-savings of Twill's digital therapeutic was about \$2,322 per person and \$313 per person, respectively, compared to a sham control.

Our comprehensive cost-effectiveness analysis and cost-utility analysis via Markov modeling demonstrated that Twill's digital wellness product was cost-effective for employers and health plans compared to a sham control by impacting depression symptom severity.^{21, 22}



* Direct medical costs included healthcare utilization (e.g., office visits, emergency department visits, hospitalizations, and medications) and indirect costs included lost productivity (i.e., presenteeism) and lost wages (i.e., absenteeism) based on average depression and concurrent anxiety severity levels.

Twill Cost-Savings Model

Twill products could drive cost savings by reducing symptom severity and providing solutions that could result in earlier care.

Applying the Model



Twill products have been shown to reduce depression symptom severity which could result in direct cost savings of \$2,322 per member per year, and indirect savings of \$313, translating to savings of **\$16 million to 18 million** (payor and employer, respectively) in a population of 1 million.*



We believe that Twill's Precision Care model can move individuals to get care sooner, potentially resulting an additional savings of **\$3 million** (payor and employer) in a population of 1 million.*

TOTAL EMPLOYER SAVINGS

\$320K

per 100 engaged individuals

TOTAL PAYOR SAVINGS

\$288K

per 100 engaged individuals

\$2,322

Use of Twill Wellness Products could result in cost savings of \$2,322 per member per year by

**reducing
symptom
severity²¹**

\$313

Use of Twill Wellness Products could result in cost savings of \$313 per member per year by reducing symptom severity from

**improved
productivity²¹**

\$8,165

We believe that Twill's Precision Care model can move individuals to get care sooner, resulting in \$8,165 per year for each individual who is

treated earlier³

*Based on a population of 1 million, assuming that 34% of individuals experience mild to severe depression symptoms. Model assumes an activation rate of 5% and retention rate of 40% (ie. will experience symptom improvement), and that 2% of individuals activated will receive earlier care.

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