SilverCloud

Reducing costs and achieving a high return on investment through implementation and scaling of digital platforms for mental health treatment.

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WHITE PAPER

SilverCloud

Mental health disorders, such as anxiety and depression, are by far the most expensive illnesses according to the latest U.S. data on health spending. In 2016 *Health Affairs*, a leading journal of health policy thought and research, published federal data showing mental health disorders cost the government $201 billion, far exceeding spending on heart disease ($147 billion) or cancer ($143 billion). In the U.S. as many as 46 million adults will experience some form of behavioral or mental illness in a given year. However, nearly 50% percent of sufferers do not receive care because they faced treatment barriers, such as the scarcity of behavioral health practitioners, stigma, limited or exhausted budgets, and geographic remoteness.

SilverCloud is driving forward with our commitment to evolve our mental health platform and address the ever-increasing global need in mental and behavioral healthcare with clinically and cost effective solutions. We believe that technology is the key enabler to address the biggest healthcare challenge of this century, maximizing clinical delivery while enhancing patient access and choice, through the ability to engage with treatment at a time that fits into diverse lifestyles and through devices that are a part of our everyday lives.

Clinically led full randomized control trials (RCT) have demonstrated that SilverCloud Health's programs are extremely effective, engaging with patients and providing positive clinical outcomes that are on par with face-to-face therapy. The efficacy data is compelling and is evident across a very large and diverse range of cases.

With proven results in major health systems globally, SilverCloud's impact on consumers and clinicians is transforming their daily lives, empowering consumers with therapy they can control, and scaling care delivery that clinicians are able to rapidly integrate into clinical pathways.

Epidemiology of Mental Health

The high prevalence of mental health conditions in the U.S. is well established. The most recent data by the National Institute for Mental Health (NIMH) indicates that approximately **1 in 5 US adults are currently diagnosed with some form of mental illness.** The prevalence is higher in females (22.3%) vs. males, and young adults (25.8%) vs. their older counterparts (13.8% in those 50 or over). Also, according to the latest Global Burden of Disease (GBD) study, depressive and anxiety disorders were the leading causes of disability amongst all mental disorders in the US. Both were amongst the top 10 causes of disability overall, with depression 5th and anxiety 7th in the GBD study.

Despite these high numbers, **56% of US adults with a mental illness do not receive treatment** (Mental Health in America, 2018). One of the main explanations, as reported by the American Psychological Association, is 1 in 4 patients seen in primary care are depressed but less than 1/3 of these identified as having depression during their consultation. When patients do seek treatment, it is often inadequate, as exemplified in a recent survey where only 36% of respondents with anxiety reported having received adequate psychological treatment over 5 years (Weisberg et al., 2014). There is also the continued effect of stigma influencing how patients are supported and seek treatment, with a CDC report mentioning that only 25% of adults with mental health symptoms believe that people are caring and sympathetic towards people with mental disorders.
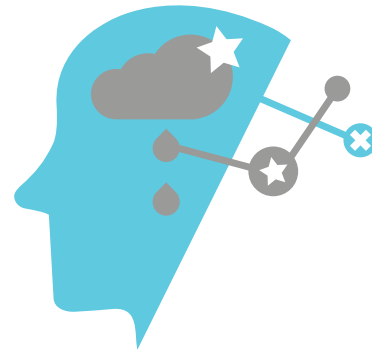
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Mental Health and Long-Term Conditions

Long-term conditions (LTCs) are amongst the most prevalent and costly in the US. Nearly half of all Americans suffer from at least one LTC, and these together account for nearly 75% of aggregate healthcare expenditure, or an estimated **$5,300 per person annually**. In terms of public insurance, treatment of chronic diseases comprises an even more significant proportion of spending: 96 cents per dollar for Medicare and 83 cents per dollar for Medicaid (Raghupathi, 2018).

There is a significant overlap in mental and physical health, and many studies have acknowledged the high prevalence of the most common mental disorders (depression and anxiety) present in those suffering from LTCs. Chronic Obstructive Pulmonary Disease (COPD), for example, is associated with anxiety in 55% of cases and depression in 40% of cases (Yohannes et al., 2010). As far as Coronary Artery Disease (CAD) is concerned, many studies

have associated symptoms of depression and depressive disorder to future risk of CAD and CAD-related mortality, and these findings have been replicated in males (Hippisley-Cox et al., 1998), females (Whang et al., 2009), adult community cohorts (Anda et al., 1993; Penninx et al, 2001), and elderly populations (Ariyo et al. 2000) alike.

The vast amount of information available on this association has warranted several systematic reviews and meta-analyses, which have unanimously concluded a positive relationship between depression and risk for developing CAD. The most recent meta-analysis included 30 studies and close to 1 million participants (Gan et al., 2014). A recent meta-analysis of 20 studies also confirms an increased risk for CAD among people with baseline anxiety, and this was after adjusting for demographics, health behaviors, and biological risk factors (Roest et al., 2010). Diabetes is also firmly established as a risk factor for depression, with 11 different studies together showing a **24% increase in depression amongst people with Type 2 Diabetes** (Nouwen et al., 2010).

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Cost of Mental Health

Mental disorders were the costliest conditions in the US as recently as 2016, totaling $201 billion in expenditure overall (Roehrig, 2016). A report by the American Psychiatric Association highlights the healthcare costs of those under Medicare, Medicaid, and commercial insurance with a mental health disorder. In the Medicare population, the average cost per member per month was $1,409, compared to $582 in those without a mental disorder. For those under Medicaid, the costs were $1,301 vs. $381, and in those under commercial insurance, the costs were $903 vs. $340. In total, the **average costs were 2.5 higher in those who had a mental health disorder**. Those with mental health disorders use a higher proportion of dollars on facility-based services than those without mental health disorders, with 56% of all healthcare spending distributed in both inpatient and outpatient services. Specifically, for a condition such as Major Depressive Disorder (MDD), the difference in long-term costs is stark. Medicare recipients with no history of MDD had six-year costs of $40,670 on average, while for those with MDD the figure rose to $87,445 (Alexandre et al., 2016).

A necessary consequence of depression/anxiety in those with LTCs is their contribution to higher costs. These costs can come via increasing emergency care visits, admissions (Guthrie et al., 2016), outpatient visits and longer hospital stays after re-admission (Frasure-Smith et al., 2000). Given the information on increased medical costs in depressed versus non-depressed patients in population samples where chronic physical conditions have been controlled, it is likely that depression is a powerful driver of costs in general (Katon et al., 2003). A big reason for increased costs is likely to be non-adherence to medication, as **depressed patients are 3 times more likely to be non-compliant to treatment recommendations as compared to their non-depressed counterparts** (DiMatteo et al., 2000).

In the US, claims data from the Centers for Medicare and Medicaid Services (CMS) showed that patients with depression had mean six-year medical costs almost double the size of those without depression ($87.4k vs. $40.6k) (Alexandre et al., 2016). In the case of diabetes specifically, Medicaid recipients' costs were amplified from $9.5k to $16.3k annually when dealing with a comorbid mental health diagnosis, for CAD the costs rose from $8.8k to $15.4k, and for hypertension these annual costs were $15.7k without and $24.7k with a comorbid mental health condition (Melek, 2014).

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Treating Mental Health Reduces Costs

Psychological interventions that treat mental health can reduce general medical costs via what is known as the 'medical cost-offset effect.' This effect is illustrated in several studies, and a review of over 90 of these showed that 90% reported a decrease in medical utilization following psychological treatment. This analysis was done in studies comparing treatment groups to control groups (where no treatment was given), and those undergoing treatment reduced utilization on average by 15.7%, while those in the control group increased usage by 12.3%. Where hospital stays were measured, the average

reduction was 2.52 hospital days per individual (Chiles et al., 2006).

Within LTCs, the value of integrating treatment and incorporating behavioral and mental health treatments is substantial. The American Psychiatric Association has calculated a value opportunity of $31 billion in the Medicare market through this approach, with conditions such as Diabetes with and without complications ($9.5 billion), Ischemic Heart Disease ($7.2 billion) and Chronic Obstructive Pulmonary Disease ($6.4 billion) amongst those having the most value potential. The value opportunity in the Medicaid market totals $100 billion through the integration of mental health and medical treatments (Melek et al., 2014).
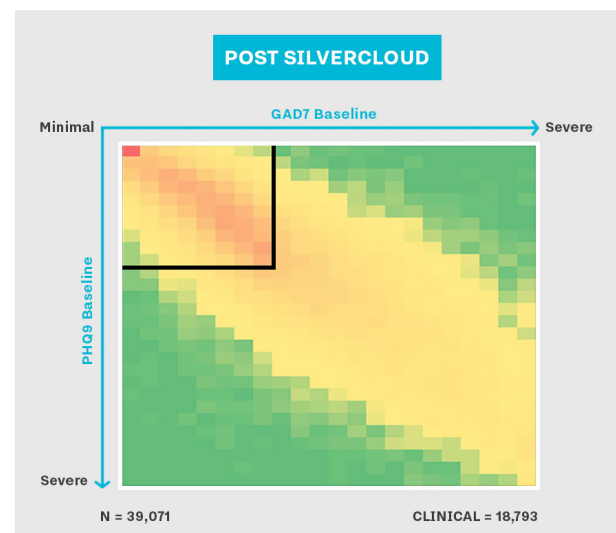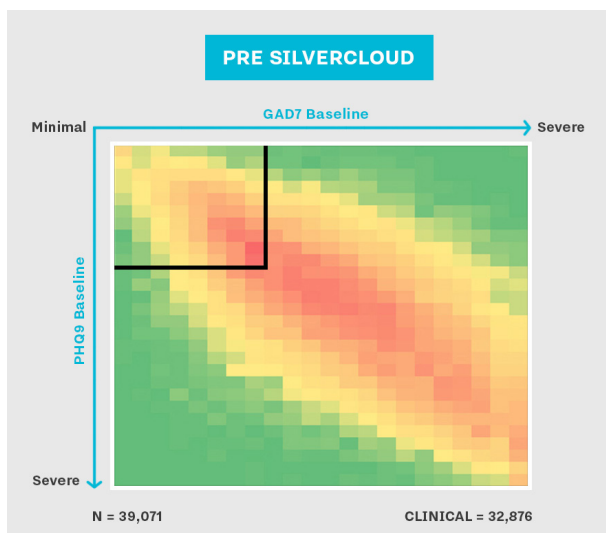
Heat map showing the changes in depression and anxiety symptom scores amongst all SilverCloud users. Trend shows overall movement from more severe symptoms to minimal symptoms upon completion of treatment with SilverCloud digital therapeutics.

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iCBT to Treat Mental Health at Scale

A recent development in the treatment of mental health conditions is through digital platforms, primarily using psychological interventions such as cognitive behavioral therapy, delivered via the internet, known as internet cognitive behavior therapy (iCBT). Many studies have been published on the effectiveness of iCBT, leading to systematic reviews of several studies showing overall positive outcomes in depression (Wright et al., 2019) and anxiety (Olthuis et al., 2016). iCBT delivery can be supported or unsupported. These latter interventions are readily disseminated and mostly targeted at prevention. However, supported interventions for the treatment of depression and anxiety lead to better outcomes and have higher retention rates (Richards & Richardson, 2012; Wells et al., 2018; Wright et al., 2019).

iCBT can be implemented into routine clinical practice and scaled to increase and complement the reach of existing services. The ability of an online platform to be accessed from anywhere, once an individual user is granted access by the service providing the digital intervention, reduces barriers to care such as stigma and those associated to patients with mobility and accessibility issues. Support is delivered online asynchronously, giving flexibility to the mental health professional providing the support, making it easier to incorporate into existing services.

In addition to the proven effectiveness of iCBT, throughout the life course of a patient's condition, iCBT has the potential to decrease health care costs. For mild to moderate phases of depression and anxiety, iCBT works by moving patients to recovery at a higher rate than other treatments at that level. In integrated services, iCBT can be preventative by reducing mental health symptoms linked to complications and increased health service use. Upon discharge, iCBT can help ease the transition into outpatient care and reduce readmission rates.

Economic Evaluation of iCBT

Recently a review was conducted of 16 separate studies which undertook economic evaluations of iCBT interventions for a range of mental health conditions, with the intervention being compared to a control group. Results demonstrated that supported internet interventions for depression, anxiety, smoking cessation and alcohol consumption had favorable probabilities of being more cost-effective when compared to the waiting list, treatment-as-usual, group cognitive behavior therapy, telephone counseling or unsupported iCBT (Donker et al., 2015). Studies in the review adhered to criteria for determining high-quality standards of research, and thus the potential of iCBT to reduce costs at a large scale is promising to say the least.

> ## 65% of users show clinically significant reduction in symptom scores.

* reduction on PHQ-9 depression score of 3+, or reduction on GAD-7 anxiety score of 2+

SilverCloud Health as Solution through Effectiveness, Scalability, and Cost Reduction

The SilverCloud Health library of programs, built and developed using the principles of iCBT, have proven feasible, acceptable, and effective at reducing symptoms of depression and anxiety in different populations. The SilverCloud programs achieved the highest classification and were used as an exemplar in national clinical care guidelines for technology-based interventions for behavioral health (National Institute for Health and Care Excellence, 2018). Unlike traditional modes of therapy, these programs allow for a wide-reaching population to access treatment 24/7 and continue having access beyond the allotted duration of CBT therapy, which is usually 8 weeks. They also facilitate scalability by embedding seamlessly into existing patient pathways and health care systems.

Proven SilverCloud outcomes include

91%

reduction in care delivery costs compared to face-to-face therapy

6-10 times

increase in patient throughput vs. telephonic and face-to-face

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The reduction in costs, achievable throughout the different levels of health care with SilverCloud, is apparent. Including an initial individual assessment of 45 minutes, then 5 reviews delivered online, taking approximately 10 minutes to complete, the cost of iCBT with SilverCloud averages $65 per completed treatment. SilverCloud delivery is significantly lower than comparative costs of face-to-face therapy, which average $475 per patient, based on initial assessment of 45 minutes and 5 follow-up sessions of 30 minutes, each costing anywhere between $80-120 (Babakian, 2013). Additionally, as a preventative tool, SilverCloud's impact on costs for emergency department (ED) visits is

substantial. 1 in 8, or nearly 12 million of the 95 million hospital ED visits, were for mental health disorders, substance use, or both (Weiss et al., 2016). SilverCloud Health can reduce patient visits to the ED for mental health issues by 5%, resulting in upwards of $1,105,000 in savings through preventative care and early intervention. By achieving better clinical outcomes through cost-effective measures that signify a strong potential for rapid return on investment (ROI), SilverCloud Health can improve how mental and behavioral health is delivered as a whole. Digital delivery will effectively reduce the burden on health care systems and translate to changes at the individual, patient group, and societal level.

Why Choose SilverCloud

- SilverCloud is the leading provider of online mental health, behavioral health and chronic management healthcare solutions delivering evidence-based content, tools and supportive programs to over 250 partners

- Over 16 years' worth of clinical research and real-world implementations, published by our team of experts in leading academic journals and presented at the primary international conferences on digital health

- Our large-scale RCTs show effectiveness and recovery rates which are in line with those seen in face-to-face therapy

- Care consulting team provides informed guidance on digital care design, on-boarding, patient engagement, platform implementation and utilization in health organizations

- One platform covering many different behavioral health conditions and patient severity types to include chronic and comorbid conditions

- Strong research pipeline – currently 16 clinical trials in 6 countries

- Our mental health platform flexes around a provider's specific service delivery needs and care pathways.

Authors

Dr. Jorge E Palacios, MD, PhD, is a clinical researcher for SilverCloud Health and the E-Mental Health Research Group at Trinity College Dublin. He completed his PhD in Psychological Medicine in London, at the Institute of Psychiatry, Psychology, and Neuroscience (IoPPN). His work on trajectories of depression and anxiety symptomatology in Coronary Heart Disease earned him the Young Investigator of the Year prize from Elsevier and the European Association of Psychosomatic Medicine in 2017. Prior to his PhD, Dr. Palacios obtained his medical degree at the National Autonomous University (UNAM) in Mexico City, and won a scholarship to undertake a Masters in Psychiatric Research from King's College London, which he passed with distinction in 2012.

Dr Derek Richards, MSc, PhD, is the Chief Science Officer at SilverCloud health. He is part of the executive team that decides the strategic direction of the company and the execution of that strategy for success. Since 2012, SilverCloud has built a successful enterprise and gained significant market traction. SilverCloud's success is built on its robust empirical research base. As Chief Science Officer, Dr. Richards knows that a central aspect of where SilverCloud is going is the continued attention to research. SilverCloud has a rigirous research strategy that supports the commercial strategy that SilverCloud is committed to successfully realizing. Dr. Richards is also the Director of the e-mental health group at the School of Psychology, Trinity College Dublin, where he is involved in understanding how we can leverage technologies to benefit mental health, health in general and our wellbeing. Digital health's contribution to mental and behavioral healthcare has been significant, but we also know that we have most likely only begun to scratch the surface of the potential that current and emerging technologies can offer.

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