

# Evidence-Based Programs ROI Assessment Report

Chronic Disease Self-Management  
Education (CDSME)

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# Acronyms

Acronym	Definition
ACL	Administration for Community Living
BBC	Building Better Caregivers
CDSME	Chronic Disease Self-Management Education
CPSMP	Chronic Pain Self-Management Program
DSMP	Diabetes Self-Management Program
EB	Evidence-based
EBPs	Evidence-based programs
ED	Emergency department
GDP	Gross Domestic Product
HAPID	Healthy Aging Programs Integrated Database
MDD	Major Depressive Disorder
NCOA	National Council on Aging
OLS	Ordinary Least Squares
PTSD	Post-Traumatic Stress Disorder
QALYs	Quality-Adjusted Life Years
ROI	Return on Investment
SMI	Serious Mental Illness



# Evidence-Based Programs ROI Assessment Report

## Chronic Disease Self-Management Education (CDSME)

### Executive Summary

#### 1.1 BACKGROUND AND PURPOSE

Chronic diseases such as heart disease, diabetes, arthritis, and depression represent a growing public health crisis in the United States, especially among older adults. Over 75% of healthcare expenditures are attributed to the treatment of chronic conditions, and this burden is poised to escalate in the coming years. One in five Americans are projected to be aged 65 years or older by 2030, and with 60-75% of this group living with multiple chronic conditions, the demand for cost-effective strategies to manage chronic diseases is more urgent than ever.

In response, the National Council on Aging (NCOA), in partnership with the Administration for Community Living (ACL), has implemented Chronic Disease Self-Management Education (CDSME) programs nationwide. These evidence-based interventions, including the Stanford Chronic Disease Self-Management Program (CDSMP), Diabetes Self-Management Program (DSMP), Tomando Control de su Salud, and others, equip older adults with the skills and confidence to better manage their conditions and reduce healthcare utilization. Between 2010 and 2024, more than 500,000 older adults participated in CDSME programs funded by ACL and delivered through community partners. This executive summary presents key findings from a national return on investment (ROI) assessment using participant-level pre-post data from the Healthy Aging Programs Integrated Database (HAPID).

This assessment provides evidence to inform policymakers on the health and economic value of CDSME programs. It:

- Measures changes in participant health and behavior following program participation
- Estimates the healthcare cost savings associated with those changes
- Calculates the return on federal investment in CDSME programming
- Offers actionable recommendations to support program expansion and sustainability

# Executive Summary

## 1.2 METHODOLOGY OVERVIEW

This return on investment (ROI) study used a robust, six-step methodology to analyze CDSME program effectiveness and translate outcomes into economic terms. Data were drawn from HAPID, encompassing 532,503 individuals enrolled in ACL-funded CDSME programs between 2010 and 2024. Data included demographic indicators, age, sex, race, highest education attained chronic conditions, and disability types. Participants were matched on pre- and post-program surveys and the data was reshaped for longitudinal analysis. Fixed effects regression estimated within-person changes over time, while random effects models explored associations across demographic and program characteristics.

Key outcomes included general health, self-efficacy, and loneliness and isolation. Mental health outcome improvements was monetized using nationally reported cost estimates (adjusted to 2024 dollars) from peer-reviewed literature. Annual mental healthcare costs range from a low of \$2,796 to a high of \$7,445. Total savings were calculated using “loneliness” outcome improvement from fixed effects regression model multiplied by associated costs and modeled under conservative, mean, and optimistic mental health cost saving scenarios to provide a credible range of potential economic benefits.

## 1.3 KEY FINDINGS

The results of this analysis reveal compelling evidence that CDSME programs yield significant health improvements and economic benefits. Participants experienced marked improvements in several key areas following completion of a CDSME program.

**Table 2: Results of fixed effects regressions for key CDSME program outcomes**

Outcome Measured	Before the Program	After the Program	Change	What This Means
General Health	2.53	2.69	<b>6% improvement</b>	Participants reported feeling healthier overall
Self-Efficacy	7.72	8.00	<b>4% improvement</b>	Greater confidence in managing their own health
Loneliness	2.22	2.19	<b>1.4% reduction</b>	Small decrease in feelings of loneliness
Isolation	2.06	2.05	No significant change	No meaningful change in social isolation

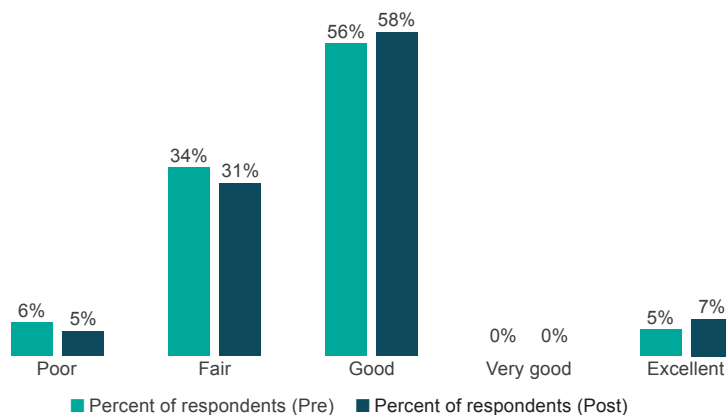
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## 1.3.1 Self-reported General Health

The distribution of self-rated general health (5-point scale), in Figure 2, showed a modest shift toward more positive perceptions following participation in the program. The majority of respondents rated their health as “Good” both before and after CDSME programs, with this category increasing slightly from 56% to 58%. The proportion reporting “Fair” health decreased from 34% to 31%, while those reporting “Poor” declined marginally from 6% to 5%. The proportion of respondents who rated their health as “Excellent” increased from 5% pre-program to 7% post-program suggesting a small but encouraging movement toward more favorable health self-assessments among CDSME participants. In addition, fixed effects regression model results in Table 2 showed significant improvement in self-rated general health, with an average improvement of 6% post CDSME program participation.

**Figure 2: Self-reported General Health**

In general, would you say that your health is?



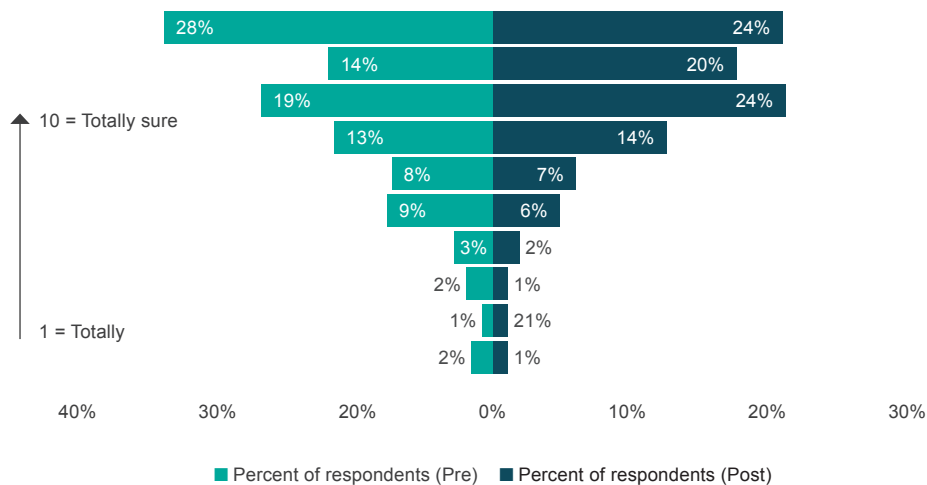
## 1.3.2 Self-Efficacy

A separate analysis of self-efficacy scores shows an encouraging shift in CDSME participants’ confidence in managing their health following their participation. Before the intervention, as shown in Figure 3, scores were more evenly distributed across the mid-to-high range, with 28% of participants rating their self-efficacy at the highest level of 10, and another 19% selecting 8. Post CDSME, the proportion of participants selecting 8 increased from 19% to 24%, while those selecting 9 rose from 14% to 20%. This redistribution suggests a shift toward high levels of perceived self-efficacy. At the same time, the percentage of respondents selecting the lowest scores (1 to 4) remained small and generally declined. Results from a fixed effects regression model in Table 2 support this finding, indicating a 4% statistically significant improvement in the self-efficacy post participation in CDSME programs.

# Executive Summary

**Figure 3: Self-reported Self Efficacy**

How sure are you that you can manage your condition so you can do the things you need and want to do?

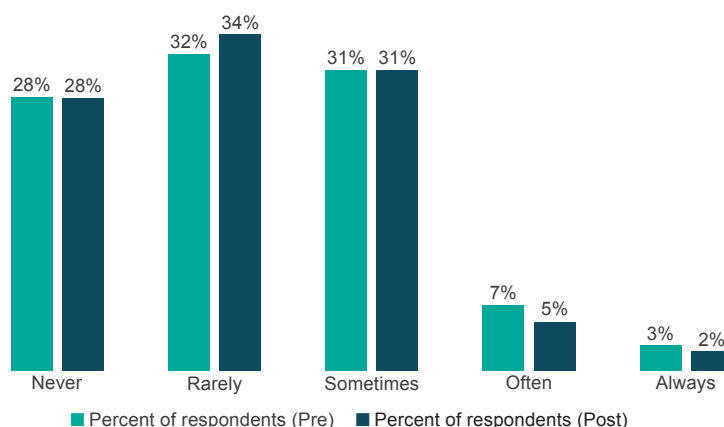


### 1.3.3 Loneliness

The distribution of self-reported loneliness before and after CDSME programs as shown in Figure 4, suggest a slight overall improvement in participants' experiences of social connectedness. The proportion of respondents who reported "rarely" feeling lonely increased from 32% to 34%, while those reporting "sometimes" remained stable at 31%. More notably, the percentage of participants who reported feeling lonely "often" declined from 7% to 5%, and those who reported feeling lonely "always" dropped from 3% to 2%. These changes, although modest, suggest that the program had a small positive effect in reducing the prevalence of more frequent and severe loneliness among participants. This is also consistent with results from fixed effects regression model in Table 2, showing a significant but modest reduction in loneliness post participation in CDSME programs.

**Figure 4: Self-reported perception on Loneliness**

How often do you feel lonely or isolated?



# Executive Summary

## 1.3.4 Return on Investment (ROI)

The analysis translated these health outcomes, particularly improvements in loneliness, a key driver of mental health service utilization, into cost savings. Loneliness, a leading predictor of depression and anxiety, is prevalent among older individuals, especially those living alone or managing multiple chronic conditions. By creating a safe, supportive, and peer-led environment, CDSME workshops foster social connectedness, reduce stigma, and build resilience. Mental health conditions such as depression and anxiety account for billions in healthcare spending annually, and interventions that reduce loneliness have been shown to significantly lower treatment needs.

**Table 10: Key Outcome Improvement**

Variable	Mean (Pre)	Mean (Post)	Improvement
General Health	2.53	2.69	0.15
Self-Efficacy	7.72	8.00	0.28
Loneliness	2.22	2.19	0.04

Using peer-reviewed cost estimates adjusted to 2024 dollars, the study projected annual savings per CDSME participant ranging from \$112 (conservative estimate) to nearly \$298 (optimistic scenario), based solely on improvements in loneliness. When scaled across the entire HAPID participant base of 532,503 individuals, the estimated total mental health cost savings ranged from \$59.6 million to \$158.6 million. After accounting for the full program delivery cost of \$50.7 million between 2017 and 2024, the estimated net benefit ranged from \$8.9 million to \$107.9 million.

**Table 11: Cost Savings Estimates**

Scenarios	Avoided Per Participant	Cost	Savings Per participant	Total Savings N=532,503
Scenario 1 (Lower)		\$2,796.76	\$111.87	\$59,571,323.61
Scenario 2 (Mean)	0.04	\$5,681.24	\$227.25	\$121,011,093.75
Scenario 3 (Upper)		\$7,445.00	\$297.80	\$158,579,393.40

**Table 12: Net Benefit Estimates**

Scenarios	Total Savings N=532,503	Total Program Cost	Net Benefit
Scenario 1 (Lower)	\$59,571,323.61		\$8,869,286.61
Scenario 2 (Mean)	\$121,011,093.75	\$50,702,037.00	\$70,309,056.75
Scenario 3 (Upper)	\$158,579,393.40		\$107,877,356.40

# Executive Summary

It is important to note that these figures underestimate the true economic value of the program, as they exclude savings from reduced hospital admissions, emergency department visits, and outpatient care all outcomes that CDSME programs are known to influence but were not captured in the HAPID database.

## 1.4 POLICY IMPLICATIONS

The findings from this study have implications for Medicare, Medicaid, and public health policy. With older adults accounting for the majority of chronic disease and mental health expenditures, even modest improvements in self-management and social connectedness can translate into substantial system-wide savings.

Policymakers should consider:

- Sustaining and expanding federal investment in CDSME programs through ACL's Evidence-Based Programs portfolio as this will yield scaled health and economic benefits.
- Integrating CDSME into Medicaid waivers incentivizing states and plans to include CDSME as a reimbursable service under Section 1115 Medicaid waivers, D-SNP models, and Medicare Advantage supplemental benefits.
- Improving data Infrastructure to capture key healthcare utilization indicators (such as hospitalizations, emergency department visits etc.) and program related costs. This would allow future analysts to quantify downstream cost savings more precisely and fully capture the return on investment of CDSME programs.

In sum, CDSME is a high-value, low-cost intervention that supports healthier aging, with demonstrable benefits for individuals, communities, and federal health systems. As the U.S. population ages and the burden of chronic disease intensifies, investing in programs that build self-efficacy, improve health, and reduce costs is not just prudent, it is essential.

## 1.5 LIMITATIONS

While the report presents robust findings, it acknowledges certain limitations:

- The absence of direct healthcare utilization data (e.g., ER visits, hospitalizations) in HAPID limited the scope of cost savings estimations.
- The lack of granular cost data from grantees necessitated the use of aggregate funding across grantees by number of participants on HAPID database as a proxy for per-participant cost.
- Self-reported outcomes, while standardized and widely used, are subject to recall and social desirability bias.

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Despite these limitations, the analysis offers a conservative yet meaningful estimate of CDSME's potential value, particularly with respect to improvements in self-efficacy, general health, and loneliness. Future evaluations would benefit from more robust data infrastructure, including standardized utilization metrics, comprehensive cost tracking, and claims data integration to enable a fuller understanding of the program's clinical and economic impact.

## 1.6 CONCLUSION

CDSME programs offer a powerful solution to one of the most pressing challenges in public health: managing chronic disease among an increasingly aging population. The evidence presented in this report underscores that these programs not only improve individual health outcomes such as general health, self-efficacy, and loneliness, but also generate meaningful financial returns by reducing the cost burden on our healthcare system. As federal and state policymakers seek to build a sustainable, and person-centered health system, CDSME programs should be recognized and funded as a strategic investment.

## 2.1 INTRODUCTION

Chronic diseases such as heart disease, diabetes, arthritis, and depression represent a growing public health crisis in the United States, especially among older adults. Over 75% of healthcare expenditures are attributed to the treatment of chronic conditions, and this burden is poised to escalate in the coming years.<sup>1</sup> One in five Americans are projected to be aged 65 years or older by 2030, and with 60-75% of this group living with multiple chronic conditions,<sup>2</sup> the demand for cost-effective strategies to manage chronic diseases is more urgent than ever. In addition to the cost burden measured not only in the rising Medicare and Medicare expenditures, there is also the diminished quality of life and loss of independence among the older adults.<sup>3</sup> Mental health conditions such as anxiety and depression, which are common comorbidities in older populations, further increase healthcare utilization and cost.<sup>4</sup>

In response, evidence-based interventions like the Chronic Disease Self-Management Education (CDSME) programs have emerged as a scalable and impactful solution. Chronic Disease Self-Management Education (CDSME) programs, developed at Stanford University and widely disseminated across the U.S., are structured, evidence-based interventions that are designed to help individuals living with chronic health conditions gain the confidence and skills needed to manage their symptoms and improve their overall well-being. These structured six-week workshops empower participants to better manage their health through skill-building in areas such as medication adherence, nutrition, physical activity, goal setting, and effective communication with healthcare providers. Programs are peer-led, community-based, and highly adaptable, with formats available both in-person and online.<sup>5</sup> Some key evidence-based CDSME programs implemented and/or supported by National Council on Aging (NCOA) as approved by the Administration on Community Living (ACL) include:

- **Chronic Disease Self-Management Program (CDSMP):** A peer-led, six-week workshop that equips adults with chronic health conditions to better manage their symptoms and maintain active, fulfilling lives. The curriculum covers goal setting, problem-solving, healthy eating, physical activity, and communication strategies, resulting in improved health behaviors and reduced healthcare utilization.
- **Tomando Control de su Salud:** A Spanish-language adaptation of CDSMP, tailored for Spanish-speaking communities. It maintains the same core content while addressing cultural norms and language preferences, empowering participants with chronic conditions to manage fatigue, pain, and depression through supportive group learning.
- **Diabetes Self-Management Program (DSMP):** The DSMP provides adults with type 2 diabetes with essential tools to manage their condition. Participants learn about nutrition, physical activity, medication adherence, blood sugar monitoring, and emotional regulation. The workshop promotes proactive self-care and reduces diabetes-related complications.

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<sup>1</sup>SangNam Ahn et al., "The Impact of Chronic Disease Self-Management Programs: Healthcare Savings through a Community-Based Intervention," *BMC Public Health* 13, no. 1141 (2013): 2, <https://www.biomedcentral.com/1471-2458/13/1141>.

<sup>2</sup>Rashmita Basu et al., "Cost-Effectiveness of the Chronic Disease Self-Management Program: Implications for Community-Based Organizations," *Frontiers in Public Health* 3 (2015): 1, <https://doi.org/10.3389/fpubh.2015.00027>.

<sup>3</sup>Tzeng-Chen Han, Hsiu-Shan Lin, and Chiu-Mieh Chen, "Association between Chronic Disease Self-Management, Health Status, and Quality of Life in Older Taiwanese Adults with Chronic Illnesses," *Healthcare (Basel)* 10, no. 4 (March 24, 2022): 609, <https://doi.org/10.3390/healthcare10040609>.

<sup>4</sup>Johanna K. Hohls et al., "A Systematic Review of the Association of Anxiety with Health Care Utilization and Costs in People Aged 65 Years and Older," *Journal of Affective Disorders* 232 (2018): 163–176. <https://doi.org/10.1016/j.jad.2018.02.011>.

<sup>5</sup>National Council on Aging, "Get the Facts on Chronic Disease Self-Management," last modified February 23, 2024, <https://www.ncoa.org/article/get-the-facts-on-chronic-disease-self-management/>.

# Introduction

- **Programa de Manejo Personal de la Diabetes:** A Spanish-language version of DSMP that offers culturally relevant content for Hispanic/Latino communities. It delivers the same six-week structure and emphasizes healthy coping mechanisms, improved dietary practices, and peer support.
- **Chronic Pain Self-Management Program (CPSMP):** CPSMP targets individuals experiencing chronic pain, including arthritis and fibromyalgia. The program focuses on non-pharmacological pain management techniques, medication safety, and mental health support to increase function and reduce reliance on emergency care.
- **Cancer:** Thriving and Surviving: Aimed at cancer survivors, this six-week program helps individuals address fatigue, fear of recurrence, physical limitations, and emotional wellbeing. It provides tools for managing ongoing health challenges and encourages lifestyle adjustments that support recovery.
- **Positive Self-Management Program (for HIV):** This program serves adults living with HIV by enhancing their ability to manage symptoms, maintain treatment adherence, and reduce risky behaviors. Peer facilitators guide discussions on coping strategies, healthcare communication, and building a support network.
- **Building Better Caregivers (BBC):** BBC is designed for informal caregivers of individuals with cognitive impairments or chronic illnesses. The program builds caregiver confidence, teaches stress management, and provides strategies for effective caregiving, all of which contribute to improved outcomes for both caregivers and care recipients.

Studies have investigated the benefits of CDSME programs and have found evidence that are both clinically and fiscally compelling. National studies show that CDSME participation has resulted in significant reductions in emergency room visits and hospitalizations among older adults within six months.<sup>6,7</sup> Researchers have also found evidence linking CDSME programs to better mental health outcomes for participants.<sup>8</sup> The reduction in healthcare utilization has been found to translate into healthcare cost savings per person, which when scaled across the U.S. adults with chronic conditions, CDSME could yield up to \$3.3 billion in annual savings for the healthcare system.<sup>9</sup> Further evidence using quality-adjusted life years (QALYs) confirms the program's cost-effectiveness, with incremental cost-effectiveness ratios well within accepted thresholds for public health investments.<sup>10</sup>

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<sup>6</sup>Marcia G. Ory et al., "Successes of a National Study of the Chronic Disease Self-Management Program: Meeting the Triple Aim of Health Care Reform," *Medical Care* 51, no. 11 (2013): 992–998.

<sup>7</sup>Ralph M. Turner et al., "Evaluation of a Diabetes Self-Management Program: Claims Analysis on Comorbid Illnesses, Health Care Utilization, and Cost," *Journal of Medical Internet Research* 20, no. 6 (2018): e207.

<sup>8</sup>Rodrigo Cesar León Hernández et al., "Outcomes of a Self-Management Program for People with Non-Communicable Diseases in the Context of COVID-19," *Healthcare (Basel)* 10, no. 12 (2022): 2452.

<sup>9</sup>SangNam Ahn et al., *The Impact of Chronic Disease Self-Management Programs: Healthcare Savings through Reductions in Emergency Room Visits and Hospitalizations* (Washington, DC: National Council on Aging, 2013).

<sup>10</sup>Rashmita Basu et al., "Cost-Effectiveness of the Chronic Disease Self-Management Program: Implications for Community-Based Organizations," *Frontiers in Public Health* 3 (2015): 27.

## 2.2 REPORT OBJECTIVES

The National Council on Aging (NCOA) delivers a portfolio of evidence-based (EB) programs designed to improve the health and well-being of older adults, including Chronic Disease Self-Management Education (CDSME) programs. While previous studies have evaluated the return on investment (ROI) of individual programs, NCOA has undertaken a comprehensive analysis using participant-level, self-reported data from the Healthy Aging Programs Integrated Database (HAPID) to assess the broader societal and economic impact of CDSME initiatives.

This analysis aims to:

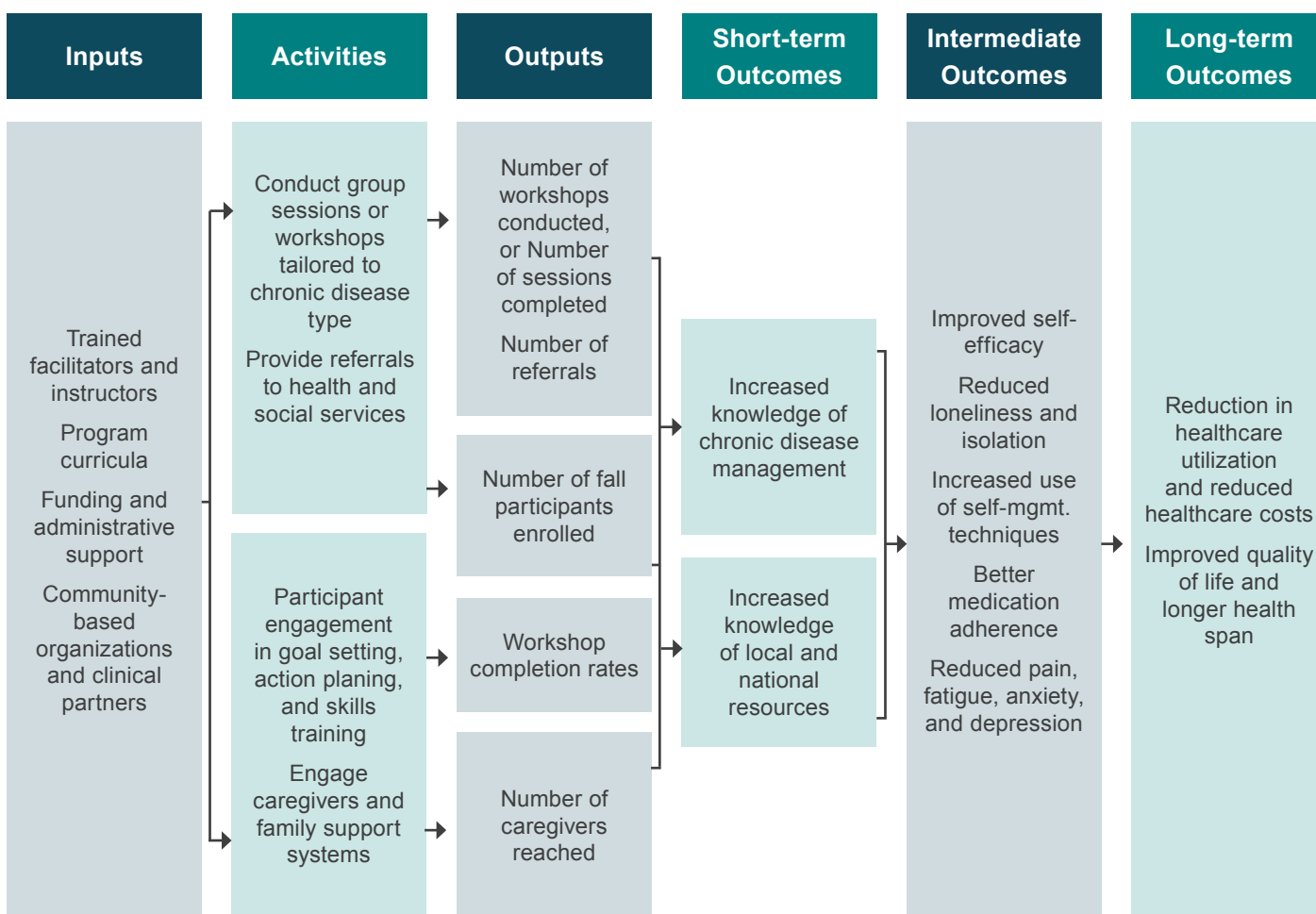
- Quantify potential healthcare cost savings from reduced emergency room visits, hospitalizations, and other high-cost services;
- Measure improvements in participants' self-management capacity, overall well-being, and quality of life;
- Demonstrate the economic and public health value of continued investment in CDSME programs;
- Inform efforts to scale and sustain evidence-based programs that reduce the burden on Medicare, Medicaid, and other public health systems.

The following section provides a synthesis of existing literature on the impacts of CDSME programs across key health, behavioral, and economic outcomes.

# Literature Review

Chronic Disease Self-Management Education (CDSME) programs have been extensively studied over the past two decades for their impact on the physical, psychological, and social well-being of individuals living with chronic conditions. Developed at Stanford University and widely implemented across community and clinical settings, CDSME is a structured, evidence-based intervention that empowers participants to take a proactive role in managing their health. The program's emphasis on peer support, action planning, and self-efficacy aligns with key public health goals and has demonstrated measurable benefits across vast populations. Figure 1 below presents a general logic model illustrating different CDSME activities and how they translate into expected outcomes that includes improved quality of life and reduced healthcare utilization.

**Figure 1: Logic Model for Chronic Disease Self Management Education (CDSME)**



This literature review synthesizes current research on the outcomes of CDSME programs, with particular focus on three domains: (1) loneliness and social isolation, (2) self-efficacy and general well-being, and (3) healthcare utilization. Each of these areas represents a critical component of chronic disease management, with implications for both individual health outcomes and broader healthcare system costs. Together, these findings highlight the multidimensional value of CDSME in improving lives, promoting health, and advancing cost-effective care.

## 3.1 LONELINESS AND ISOLATION

Chronic Disease Self-Management Education (CDSME) programs have demonstrated measurable improvements in both the psychological and social well-being of individuals living with chronic illnesses. Among the most salient benefits are reductions in loneliness and isolation, two elements closely tied to mental health outcomes, particularly among older adults and individuals with multiple health conditions. Loneliness and social isolation are well-documented risk factors for anxiety, depression, cognitive decline, and even premature mortality.<sup>11</sup> Solmi et al. (2020) analysis using a pooled data supported the longitudinal association between loneliness and suicide attempts and depressive symptoms.<sup>12</sup> The CDSME model addresses these concerns by using peer-led group sessions that foster social interaction, shared problem-solving, and mutual support.

Several studies have found that this group-based format helps participants build a sense of community and re-engage with others<sup>13</sup>, which can counteract feelings of isolation. By design, the program convenes 8 to 16 participants over six weekly sessions, promoting shared experiences, collaborative goal setting, and mutual support. Participants often report feeling more understood and less alone in their health journeys, an experience that contributes to emotional relief and improved mental well-being.<sup>14</sup> For instance, Lawn et al. (2007) reported that participants with long-term mental illnesses who took part in self-management education noted substantial psychosocial gains, including a renewed sense of self-worth, improved ability to set goals, and a stronger connection with their communities. One notable case included individuals with severe agoraphobia who overcame social withdrawal after completing the program, highlighting the role of structured group settings in reducing chronic isolation.<sup>15</sup>

In a Michigan-based translation study, participants with serious mental illness (SMI) who completed the CDSME program showed significant reductions in depression and health distress scores. The same study found improved quality of life and sleep, alongside reduced fatigue and perceived stress, suggesting that reduced isolation may indirectly enhance emotional resilience and mental well-being.<sup>16</sup> Notably, the peer-led delivery model led by Certified Peer Support Specialists was cited as instrumental in building trust and fostering social support among individuals with SMIC.<sup>17</sup> Additional evidence from the public health literature underscores the interconnection between loneliness and chronic illness. Depression is often comorbid with conditions like hypertension and diabetes, and social isolation can exacerbate these challenges by reducing treatment adherence and increasing stress-related symptoms.<sup>18</sup> Because CDSME programs equip participants with communication skills and decision-making confidence, they promote better engagement with both healthcare providers and support networks, buffering against the downward spiral of loneliness and poor health.

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<sup>11</sup>Julianne Holt-Lunstad, Timothy B. Smith, Mark Baker, Tyler Harris, and David Stephenson, "Loneliness and Social Isolation as Risk Factors for Mortality: A Meta-Analytic Review," *Perspectives on Psychological Science* 10, no. 2 (2015): 227–237.

<sup>12</sup>Marco Solmi et al., "Factors Associated With Loneliness: An Umbrella Review of Observational Studies," *Journal of Affective Disorders* 271 (June 15, 2020): 131–138.

<sup>13</sup>Marcia G. Ory et al., "Successes of a National Study of the Chronic Disease Self-Management Program: Meeting the Triple Aim of Health Care Reform," *Medical Care* 51, no. 11 (2013): 992–998.

<sup>14</sup>Ibid

<sup>15</sup>Sue E. Lawn, Maria A. Smith, and J. Hunter, "Mental Health Peer Support for People with a Psychiatric Illness: A Comprehensive Literature Review," *International Journal of Evidence-Based Healthcare* 5, no. 2 (2007): 151–160.

<sup>16</sup>Kate Lorig, Philip L. Ritter, Carolyn Pifer, and Pamela Werner, "Effectiveness of the Chronic Disease Self-Management Program for Persons with a Serious Mental Illness: A Translation Study," *Community Mental Health Journal* 50, no. 1 (2014): 96–103.

<sup>17</sup>Ibid

<sup>18</sup>Mauricio Herrera, Sarah Vaughan, and Heather Fritz, "Loneliness, Social Isolation, and Chronic Illness: A Systematic Review," *Healthcare* 12, no. 8 (2024): 1668.

## 3.2 SELF EFFICACY AND GENERAL WELLBEING

Chronic Disease Self-Management Education (CDSME) programs have demonstrated strong and consistent effects on participants' self-efficacy and general well-being, which are core outcomes for individuals living with chronic health conditions. Self-efficacy, the belief in one's capacity to manage disease symptoms and perform health-related tasks, serves as a key mechanism through which CDSME promotes long-term health improvement. Drawing from Bandura's theory of self-efficacy, the CDSME model incorporates action planning, skills mastery, modeling, symptom reinterpretation, and social reinforcement to empower individuals to take control of their health behaviors.<sup>19</sup>

In an evaluation of CDSME, participants in the treatment group experienced statistically significant gains in both measures of self-efficacy, managing symptoms and managing disease in general, along with corresponding improvements in health status indicators including fatigue, health distress, and disability.<sup>20</sup> These gains were sustained over time and were accompanied by meaningful improvements in emotional well-being and functional ability, illustrating the broader benefits of self-efficacy on quality of life. Action planning, a core practice within CDSME, reinforces these outcomes by helping participants make realistic, behavior-specific commitments each week. Lorig et al. (2014) showed that participants who successfully completed more action plans had greater gains in activity limitation, aerobic exercise, and self-efficacy at six months.<sup>21</sup> Confidence in plan completion was directly associated with successful completion, creating a reinforcing cycle of goal setting and achievement that supports sustained self-management behaviors.<sup>22</sup>

Further support for CDSME's impact on general well-being comes from a study of a peer-led, online version of the program, which showed improvements in fatigue, health distress, self-rated health, and social role functioning. Notably, self-efficacy gains mediated many of these outcomes, confirming the foundational role of confidence-building in driving both mental and physical health benefits.<sup>23</sup> CDSME's structured emphasis on self-directed learning and peer reinforcement equips participants with the confidence and tools needed to manage their health more effectively. The resulting gains in self-efficacy and general well-being represent not only improved patient experiences but also stronger foundations for long-term health behavior change. These outcomes reinforce the value of CDSME as a scalable intervention aligned with both public health goals and individual empowerment.

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<sup>19</sup>Kate Lorig et al., "The Components of Action Planning and Their Associations with Behavior and Health Outcomes," *Health Education & Behavior* 41, no. 1 (2014): 43–51.

<sup>20</sup>Dongbo Fu et al., "Implementation and Quantitative Evaluation of Chronic Disease Self-Management Programme in Shanghai, China: Randomized Controlled Trial," *Bulletin of the World Health Organization* 81 (2003): 174–182.

<sup>21</sup>Ibid

<sup>22</sup>Ibid

<sup>23</sup>Kate Lorig et al., "The South Australia Health Chronic Disease Self-Management Internet Trial," *Health Education & Behavior* 40, no. 1 (2013): 67–77.

## 3.3 HEALTHCARE UTILIZATION

The Chronic Disease Self-Management Education (CDSME) program has consistently demonstrated a measurable impact on reducing health care utilization, particularly in terms of emergency department (ED) visits, hospitalizations, and associated costs. These findings are critical for public health stakeholders and policymakers seeking strategies to improve chronic disease outcomes while reducing the strain on Medicare and Medicaid budgets.

In addition to mental health improvements, Ory et al. (2013) also found that participants in CDSME programs experienced statistically significant reductions in both emergency room visits and hospitalizations within six months of program completion. Specifically, the odds of having an emergency department (ED) visit dropped significantly from baseline to 12 months, while hospitalization rates declined meaningfully between baseline and 6 months.<sup>24</sup> Meta-analysis of CDSME studies and randomized trials examining health behaviors and utilization outcomes reinforce these findings. These analysis find statistically significant reduction in both the number of ED visits and hospitalizations, further validating the clinical utility of the CDSME programs.<sup>25,26</sup>

These outcomes were also replicated in digital environments. Evaluations of Internet-based version of CDSME have these programs result in fewer emergency visits and hospital nights among participants.<sup>27</sup> A South Australia Internet Trial also documented reduced ED visits sustained through 12 months, alongside increases in self-efficacy and health-promoting behaviors.<sup>28</sup> These utilization reductions translate into substantial economic savings. A national study of CDSME programs estimated net savings of \$364 per participant within six months, even after accounting for program delivery costs, with a key projection that if just 5% of U.S. adults with at least one chronic condition participated in CDSME, the health care system could save approximately \$3.3 billion annually.<sup>29</sup>

In sum, evidence from both qualitative and quantitative studies suggests that CDSME programs offer a dual advantage: they not only equip participants with disease self-management skills but also create social frameworks that reduce isolation. These improvements are in turn associated with enhanced mental health outcomes, particularly reductions in depressive symptoms, anxiety, and health-related distress. The alignment of these social and clinical benefits makes CDSME a powerful tool for addressing the intertwined challenges of chronic disease and mental health. CDSME programs are not only effective in helping individuals manage chronic conditions and mental health, but also instrumental in reducing unnecessary health service use. These programs offer a scalable and cost-effective solution for enhancing patient self-efficacy, promoting healthier lifestyles, and decreasing preventable acute care utilization, a win for patients, providers, and payers alike.

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<sup>24</sup>Marcia G. Ory et al., "Successes of a National Study of the Chronic Disease Self-Management Program: Meeting the Triple Aim of Health Care Reform," *Medical Care* 51, no. 11 (2013): 992–998.

<sup>25</sup>Teresa J. Brady et al., "A Meta-Analysis of Health Status, Health Behaviors, and Health Care Utilization Outcomes of the Chronic Disease Self-Management Program," *Preventing Chronic Disease* 10 (2013): 120112.

<sup>26</sup>Kate Lorig et al., "Evidence Suggesting That a Chronic Disease Self-Management Program Can Improve Health Status While Reducing Hospitalization: A Randomized Trial," *Medical Care* 37, no. 1 (1999): 5–14.

<sup>27</sup>Kate Lorig et al., "Internet-Based Chronic Disease Self-Management: A Randomized Trial," *Medical Care* 44, no. 11 (2006): 964–971.

<sup>28</sup>Kate Lorig et al., "The South Australia Health Chronic Disease Self-Management Internet Trial," *Health Education & Behavior* 40, no. 1 (2013): 67–77.

<sup>29</sup>SangNam Ahn et al., *The Impact of Chronic Disease Self-Management Programs: Healthcare Savings through Reductions in Emergency Room Visits and Hospitalizations* (Washington, DC: National Council on Aging, 2013),

# Data and Methodology

## 4.1 DATA

This study employed a structured, evidence-based approach to estimate health care cost savings and return on investment (ROI) resulting from participation in National Council for Aging's (NCOA) Chronic Disease Self-Management Education (CDSME) grant-funded programs implemented between 2010 and 2024. The study uses dataset collected from 532,503 program participants through NCOA's Healthy Aging Programs Integrated Database (HAPID). HAPID is a centralized data system developed by the National Council on Aging (NCOA) to support the evaluation and sustainability of evidence-based programs (EBPs) aimed at improving the health and well-being of older adults. HAPID integrates standardized data collected from participants enrolled in various NCOA-supported programs including CDSME, across the United States.

# Data and Methodology

**Table 1: Demographic information of CDSM participants**

Variable	Mean (sd)	N
Age	65.86 (15.13)	436,174
Number of Chronic Conditions	2.22 (2.05)	528,353
Number of Disability	0.25 (0.59)	528,353
<b>Race</b>	<b>Percentage of Participants</b>	
American Indian or Alaska Native	1.5%	7,714
Asian American	3.3%	17,448
Black/African American	16.5%	87,041
Hispanic/Latino	12.7%	415,421
Multi-Racial	1.3%	6,788
Native Hawaiian or Pacific Islander	0.5%	2,666
Unknown	23.9%	126,481
White	53.0%	280,161
<b>Education Level</b>		
Some elementary, middle, or high school	7.0%	36,859
High school graduate or GED	13.4%	70,544
Some college or technical school	15.9%	84,086
College (4 years or more)	12.9%	68,168
Bachelor's degree or higher	0.0%	3
<b>Sex</b>		
Male	20.6%	108,819
Female	65.8%	347,563
Prefer not to say	0.0%	70
<b>Disability Type</b>		
Seeing Difficulty	2.4%	137,438
Hearing Difficulty	2.9%	122,543
Physical Limitations	14.4%	219,180
Concentration Difficulty	1.2%	32,967
Errand Difficulty	1.1%	32,323
Dressing Difficulty	0.7%	32,519
Walking Difficulty	2.1%	33,721

Source: HAPID (2010-2025)

# Data and Methodology

These participants are primarily older adults, typically aged 60 and above, but may also include adults with disabilities or chronic conditions who participated in the Chronic Disease Self-Management Education (CDSME) programs. Table 1 above describes the demography of participants that enrolled in one of ACL funded CDSME program between 2010 and 2024, including their average age, sex, race, the highest education attained and disability types. Many participants were recruited through senior centers, aging services providers, healthcare organizations, or community-based nonprofits delivering NCOA-affiliated programs. As part of their participation, individuals complete standardized pre- and post-program surveys that gather information on demographics, health behaviors, chronic conditions, self-efficacy, and other key outcome measures such as loneliness and isolation. This data enables local and national stakeholders to assess how these CDSME programs impact participants' health status, quality of life, and use of healthcare services over time. The population represents a wide range of racial, ethnic, socioeconomic, and geographic backgrounds, enhances the ability of HAPID to track program reach and effectiveness across communities. Its structure also allows for a consistent, scalable approach to monitoring health outcomes and service delivery, making it a valuable resource for organizations, researchers, and funders alike.

## 4.2 METHODOLOGY

To investigate individual health outcomes of the CDSME programs and translate them into financial values that will inform funders, policymakers, and program implementers about the fiscal and societal value of CDSME programs this assessment The methodology followed a six-step process: (1) survey design and data collection, (2) data cleaning and transformation, (3) statistical estimation of program effects, (4) cost valuation of outcomes, (5) return on investment (ROI) calculation, and (6) reporting of results and sensitivity analysis. Together, these steps enabled a comprehensive evaluation of CDSME outcomes in terms of both health improvements and financial value.

### 4.2.1 Data Cleaning and Transformation

The raw HAPID data obtained from NCOA Slaesforce were cleaned and organized for analysis on Stata. Observations with missing data on key outcome variables were excluded for analysis. Each participant was assigned a unique ID, variables were renamed to distinguish pre- and post-program values, and the dataset was reshaped from wide to long format with a time variable representing two time periods, pre and post, to facilitate time-based outcome comparisons. Additional binary indicators were generated to flag whether a participant's outcome improved over time, for example, an increase in self-rated health or a decrease in reported loneliness. These transformations ensured consistency and analytical readiness for regression modeling. Key variables transformed in this process included general health, confidence in self-care, loneliness, and isolation and Table 2 provides a summary statistics of these variables.

**Table 2: Summary Statistics Table for Key Outcomes**

Variable	Mean	SD	Minimum	Maximum	N
General Health	2.65	0.80	1	5	116,826
Self-efficacy	7.80	2.05	1	10	52,011
Loneliness	2.23	0.99	1	5	15,155
Isolation	2.08	0.98	1	5	14,822

## 4.2.2 CDSME PROGRAM EFFECT ESTIMATION

The dataset was prepared for multivariate regression modeling to estimate program effects while adjusting for participant-level covariates such as age, sex, and number of chronic conditions. These covariates were included to reduce confounding and allow for a more accurate estimation of program impact. Binary, ordinal, and continuous outcome variables were analyzed using appropriate regression models—logistic (logit) for binary outcomes (e.g., improved self-care), ordered logistic (ologit) for ordinal responses (e.g., loneliness scales), and ordinary least squares (OLS) for continuous outcomes (e.g., general health rating). These models enabled calculation of marginal effects and predicted probabilities to quantify the likelihood and magnitude of improvements due to program participation.

**Outcome Measures:** A paired pre-post survey design was utilized to measure changes in participant outcomes following CDSME program completion. The survey instrument included validated measures aligned with four key domains known to influence healthcare utilization and expenditures:

- Self-rated Health (ordinal scale, 1 = Excellent to 5 = Poor): Serves as a reliable predictor of hospitalization and emergency department (ED) use.
- Self-efficacy (scale 1–10): Captures confidence in managing health conditions, linked to better self-care and reduced medical dependency.
- Loneliness and Isolation (ordinal scales, 1 = Always to 5 = Never): Psychosocial indicators strongly associated with increased healthcare use, particularly for mental health services.

## 4.2.3 COST VALUATION AND RETURN ON INVESTMENT CALCULATION

To convert outcome improvements into financial savings, the analysis assigned dollar value to improved mental health outcomes, valued at \$1,507 annually based on national healthcare cost estimates derived from peer-reviewed literature. Total savings were computed by multiplying the number of participants who demonstrated improvement by the assigned cost avoidance values. Program delivery costs, captured separately by total grant awards, were subtracted to estimate net benefit. ROI was then calculated by dividing the net benefit by the total program costs, producing a ratio that expresses the financial return for every dollar invested. Confidence intervals were calculated to account for uncertainty in outcome attribution and cost assumptions. To ensure robustness, a sensitivity analysis was conducted by varying cost assumptions and re-estimating ROI. This allows stakeholders to understand the potential range of program value under different financial scenarios.

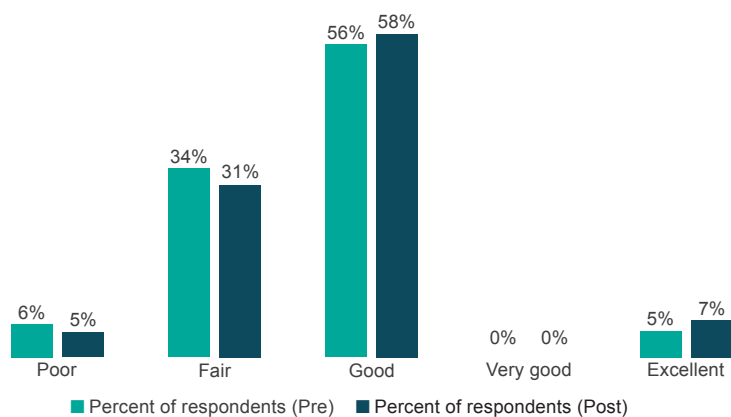
# Results

## 5.1 DESCRIPTIVE STATISTICS

To investigate potential benefits of Chronic Disease Self-Management Education (CDSME) programs, this section presents changes in key self-reported outcomes following participation in CDSME program, including perceptions of loneliness, isolation, self-efficacy, and general health. The findings highlight modest but consistent shifts toward improved well-being across multiple indicators. The distribution of self-rated general health, in Figure 2, showed a modest shift toward more positive perceptions following participation in the program. The majority of respondents rated their health as “Good” both before and after CDSME programs, with this category increasing slightly from 56% to 58%. The proportion reporting “Fair” health decreased from 34% to 31%, while those reporting “Poor” declined marginally from 6% to 5%. The proportion of respondents who rated their health as “Excellent” increased from 5% pre-program to 7% post-program suggesting a small but encouraging movement toward more favorable health self-assessments among CDSME participants.

**Figure 2: Self-reported General Health**

In general, would you say that your health is?

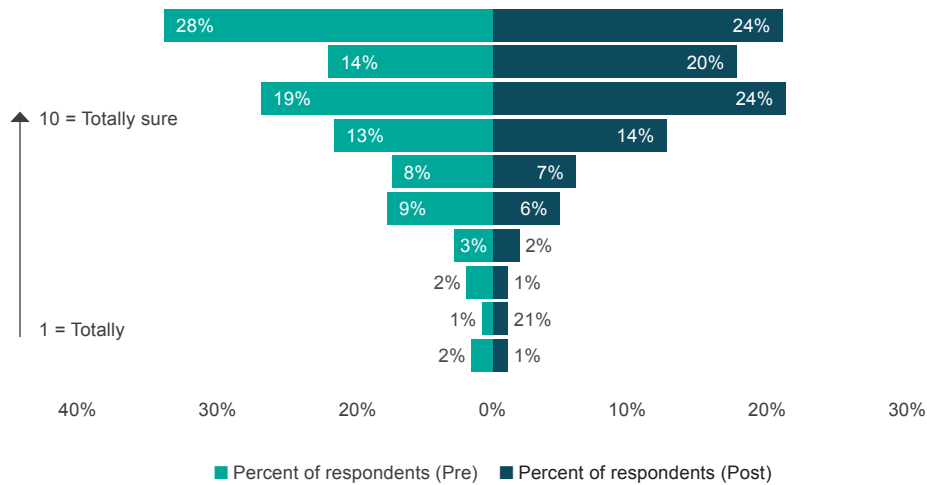


A separate analysis of self-efficacy scores shows an encouraging shift in CDSME participants' confidence in managing their health following their participation. Before the intervention, as shown in Figure 3, scores were more evenly distributed across the mid-to-high range, with 28% of participants rating their self-efficacy at the highest level of 10, and another 19% selecting 8. Post CDSME, the proportion of participants selecting 8 increased to 24%, while those selecting 9 rose from 14% to 20%. This redistribution suggests a shift toward high levels of perceived self-efficacy. At the same time, the percentage of respondents selecting the lowest scores (1 to 4) remained small and generally declined. For example, ratings of 1 and 3 dropped from 2% to 1%, and ratings of 4 fell from 3% to 2%. Moderate scores such as 5 and 6 also saw slight decreases. These patterns indicate that few participants experienced a decline in confidence, and a majority maintained or improved their perceived ability to manage their condition. Overall, the distribution in Figure 3 suggests that CDSME programs helped reinforce high self-efficacy among participants, with more individuals moving from moderate levels of confidence toward consistently high scores, while reducing the proportion who felt less confident in their ability to manage their health.

# Results

**Figure 3: Self-reported Self Efficacy**

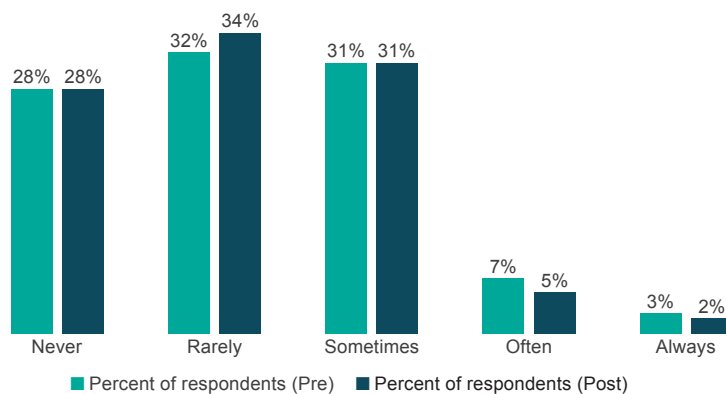
How sure are you that you can manage your condition so you can do the things you need and want to do?



The distribution of self-reported loneliness before and after CDSME programs as shown in Figure 4, suggest a slight overall improvement in participants' experiences of social connectedness. The percentage of individuals who reported "never" feeling lonely remained unchanged at 28%, indicating that the CDSME program did not increase the number of people who were entirely free of loneliness. However, the proportion of respondents who reported "rarely" feeling lonely increased from 32% to 34%, while those reporting "sometimes" remained stable at 31%. More notably, the percentage of participants who reported feeling lonely "often" declined from 7% to 5%, and those who reported feeling lonely "always" dropped from 3% to 2%. These changes, although modest, suggest that the program may have had a small positive effect in reducing the prevalence of more frequent and severe loneliness among participants.

**Figure 4: Self-reported perception on Loneliness**

How often do you feel lonely?

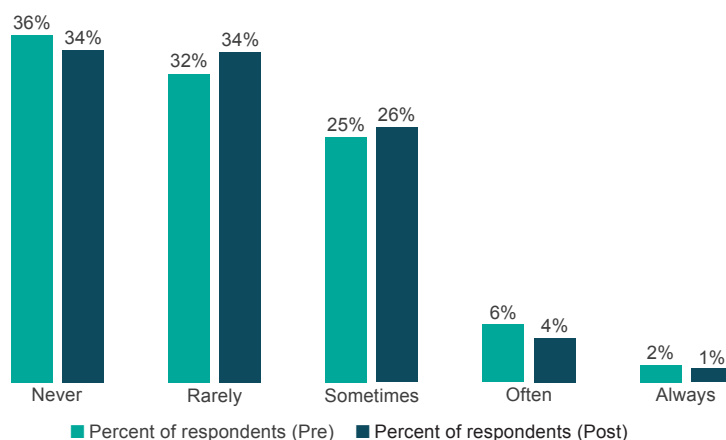


# Results

A similar trend was observed for feelings of isolation. While the percentage of respondents who “never” felt isolated decreased slightly from 36% to 34%, those who “rarely” felt isolated increased from 32% to 34%, and those who felt isolated “sometimes” rose from 25% to 26%. Most notably, reports of frequent isolation declined, with “often” decreasing from 6% to 4%, and “always” from 2% to 1%. Together, these patterns suggest that while the program did not dramatically reduce overall levels of loneliness and isolation, it may have contributed to meaningful improvements among those experiencing more frequent or severe social disconnection. The consistent downward shifts in the “often” and “always” categories across both measures point to a potential positive outcome of CDSME in alleviating persistent isolation among participants.

**Figure 5: Self-reported perception on Isolation**

How often do you feel isolated from those around you?



In summary, the post-program shifts observed across measures of loneliness, isolation, self-efficacy, and general health suggest that the intervention contributed to meaningful, though modest, improvements in participants’ overall well-being.

## 5.2 PROGRAM EFFECT ESTIMATION

### 5.2.1 Paired T-tests

To further assess the effectiveness of the CDSME programs, we conducted paired t-tests comparing pre- and post-program scores for each participant across six outcome variables as seen in Table 2. We estimated within-person changes over time by evaluating the difference in scores before and after participation, limiting analysis to individuals who had data at both timepoints. This approach is appropriate for evaluating program impact in longitudinal designs, as it controls for unobserved, fixed individual characteristics.

# Results

**Table 3: Results of fixed effects regressions for key CDSME program outcomes**

Variable	Mean (Pre)	Mean (Post)	Difference	P-value	N
General Health	2.53	2.69	0.15***	0.00	15,604
Self-Efficacy	7.72	8.00	0.28***	0.00	18,028
Loneliness and Isolation	2.23	2.22	0.00	0.84	12,149
Loneliness	2.22	2.19	-0.04***	0.00	6,447
Isolation	2.06	2.05	0.00	0.78	6,278

General Health and Self-Efficacy showed statistically significant improvements after the intervention ( $p < 0.001$ ), indicating positive changes in participants' perceived health and well-being. Loneliness showed a statistically significant but modest decrease ( $-0.04$ ), suggesting a small but meaningful reduction. Loneliness and Isolation (combined) and Isolation alone showed no significant change ( $p = 0.84$  and  $0.78$ , respectively), indicating the program did not affect these outcomes in a meaningful way. The number of paired observations (N) varied by variable due to missing data or dropout, with outcomes like General Wellbeing based on fewer cases ( $N = 1,034$ ) compared to others like Self-Efficacy ( $N = 18,028$ ).

## 5.2.2 MULTIVARIATE ESTIMATION

To better understand the factors associated with improvements in participants' self-rated general health and self efficacy; and perceptions of loneliness and isolation; multivariate analyses were conducted using random effects regression models. These models accounted for individual-level variability over time (pre and post) and allow for the inclusion of both time-varying and fixed participant characteristics. By examining a range of demographic, health-related, and program participation variables, the analyses isolated the effect of program participation while identifying key predictors of general health outcomes. Two models were estimated for each key outcome: the first includes core demographic and health covariates, while the second adds monthly income to explore potential influences of financial resources on participants' outcomes.

# Results

**Table 4: Results of Random Effects Models for General Health of CDSME participants**

Random Effects Models for General Health				
	Model 1		Model 2	
Time=Post	0.166***	(0.007)	0.164***	(0.032)
Participant: Age Today	0.005***	(0.000)	0.011***	(0.002)
<b>Race (Base=White)</b>				
American Indian or Alaska Native	-0.059	(0.033)	-0.161	(0.182)
Asian American	-0.296***	(0.016)	0.400**	(0.152)
Black/African American	-0.073***	(0.012)	-0.173**	(0.055)
Multi-Racial	-0.050	(0.038)	0.313	(0.166)
Native Hawaiian or Pacific Islander	-0.027	(0.077)		
Unknown	-0.038*	(0.016)	0.071	(0.129)
Non-Hispanic/Latino	0.092***	(0.012)	-0.112	(0.102)
<b>Sex (Base=Male)</b>				
Female	0.043***	(0.011)	0.132*	(0.059)
Prefer not to say	0.145	(0.116)	1.130	(0.641)
Education	0.084***	(0.004)	0.097**	(0.031)
Completer=1	-0.010	(0.009)	0.029	(0.055)
Disability Count	-0.132***	(0.004)	-0.128***	(0.021)
Chronic Conditions Count	-0.087***	(0.002)	-0.086***	(0.011)
Non-Veteran	-0.074***	(0.018)	-0.122	(0.107)
<b>Program Delivery (Base=In-person)</b>				
Phone or Virtual	-0.038***	(0.009)	-0.058	(0.050)
Self-Directed	0.017	(0.025)		
Mixed w/In-person	0.081	(0.071)		
Mixed w/o In-person	0.002	(0.102)		
Monthly Income			0.014	(0.009)
Constant	2.561***	(0.032)	2.069***	(0.215)
Observations	37,315		1,212	
Standard errors in parentheses * p<0.05, ** p<0.01, *** p<0.001				

# Results

Table 3 presents the results of two random effects regression models examining predictors of self-rated general health among CDSME participants. In both models, post-program participation was significantly associated with higher general health scores, indicating improvement after the intervention. Age, education level, and identifying as female were positively associated with better general health in both models, while having more disabilities or chronic conditions was consistently linked to poorer health outcomes. Race-related differences varied across models. In Model 1, Asian American and Black/African American participants reported significantly lower general health scores compared to White participants. However, in Model 2 (which included monthly income and a smaller sample), Asian American identity was positively associated with general health, suggesting potential interaction with socioeconomic factors. Delivery method was also a significant factor as participants in phone or virtual formats reported lower health scores than those in in-person programs in both models.

In Table 4, we presented the results of two models analyzing predictors of self-efficacy among CDSME participants. In both models, participation in the program was significantly associated with higher self-efficacy scores, suggesting an overall improvement in participants' confidence in managing their health following the intervention. Age and education were also positively associated with self-efficacy in Model 1, indicating that older participants and those with higher educational attainment tended to report greater self-management confidence. However, the effect of education diminished in Model 2, which incorporated monthly income.

# Results

**Table 5: Results of Random Effects Models for Self Efficacy of CDSME participants**

Random Effects Models for Self Efficacy				
	Model 1		Model 2	
Time=Post	0.214***	(0.016)	0.221*	(0.108)
Participant: Age Today	0.006***	(0.001)	0.018***	(0.006)
<b>Race (Base=White)</b>				
American Indian or Alaska Native	-0.007	(0.099)	0.457	(0.548)
Asian American	-0.417***	(0.041)	0.435	(0.416)
Black/African American	0.330***	(0.032)	0.183	(0.166)
Multi-Racial	0.117	(0.103)	0.140	(0.479)
Native Hawaiian or Pacific Islander	0.404*	(0.186)		
Unknown	0.035	(0.042)	0.275	(0.368)
Non-Hispanic/Latino	-0.257***	(0.033)	-0.045	(0.305)
<b>Sex (Base=Male)</b>				
Female	0.080**	(0.031)	0.044	(0.179)
Prefer not to say	-0.272	(0.273)	0.108	(2.035)
Education	0.098***	(0.012)	0.023	(0.096)
Completer=1	0.056*	(0.025)	0.098	(0.176)
Disability Count	-0.507***	(0.010)	-0.598***	(0.064)
Chronic Conditions Count	-0.102***	(0.005)	-0.019	(0.033)
Non-Veteran	-0.101*	(0.048)	0.083	(0.332)
<b>Program Delivery (Base=In-person)</b>				
Phone or Virtual	-0.068**	(0.025)	-0.051	(0.150)
Self-Directed	-0.274***	(0.062)		
Mixed w/In-person	0.070	(0.163)		
Mixed w/o In-person	0.155	(0.239)		
Monthly Income			0.042	(0.027)
Constant	8.106***	(0.086)	6.237***	(0.663)
Observations	35492		1451	
Standard errors in parentheses * p<0.05, ** p<0.01, *** p<0.001				

# Results

Other consistent predictors included disability and chronic condition counts, both of which were strongly and negatively associated with self-efficacy in both models suggesting lower self efficacy scores for participants with higher number of comorbidities. Participants who completed at least four sessions also showed significantly greater self-efficacy in Model 1, and women reported modestly higher scores as well. Regarding delivery format, self-directed and virtual formats were associated with lower self-efficacy relative to in-person delivery in Model 1. Model 2 also revealed a positive, though non-significant, relationship between monthly income and self-efficacy.

Overall, the results indicate that self-efficacy improved significantly post-intervention, even after adjusting for demographic and health-related variables. While the inclusion of income in Model 2 yielded additional insights, the reduced analytic sample (N = 1,451) led to wider confidence intervals and less stable estimates.

**Table 6: Results of Random Effects Models for Self-reported Loneliness and Isolation**

Random Effects Models for Loneliness and Isolation				
	Model 1		Model 2	
Time=Post	0.024**	(0.009)	0.110***	(0.033)
Participant: Age Today	-0.007***	(0.001)	-0.011***	(0.002)
<b>Race (Base=White)</b>				
American Indian or Alaska Native	0.013	(0.062)	-0.194	(0.229)
Asian American	0.085**	(0.028)	-0.011	(0.160)
Black/African American	-0.097***	(0.020)	-0.022	(0.065)
Multi-Racial	0.088	(0.065)	0.183	(0.192)
Native Hawaiian or Pacific Islander	-0.113	(0.115)		
Unknown	0.071*	(0.028)	-0.139	(0.151)
Non-Hispanic/Latino	0.219***	(0.021)	-0.399**	(0.126)
<b>Sex (Base=Male)</b>				
Female	0.088***	(0.019)	0.161*	(0.071)
Education	0.002	(0.008)	0.096*	(0.039)
Completer=1	0.032*	(0.016)	-0.073	(0.066)
Disability Count	0.186***	(0.006)	0.193***	(0.026)
Chronic Conditions Count	0.077***	(0.003)	0.102***	(0.013)
Non-Veteran	0.059*	(0.027)	0.148	(0.132)
<b>Program Delivery (Base=In-person)</b>				
Phone or Virtual	0.063***	(0.016)	0.156**	(0.058)
Self-Directed	-0.050	(0.040)		
Mixed w/In-person	0.175	(0.272)		
Mixed w/o In-person	0.053	(0.357)		
Monthly Income			-0.048***	(0.010)
Constant	1.843***	(0.052)	2.316***	(0.264)
Observations	23,241		1,357	
Standard errors in parentheses * p<0.05, ** p<0.01, *** p<0.001				

# Results

Table 5 presents the results of two random effects regression models examining predictors of self-reported loneliness and isolation among CDSME participants. In both models, post-program participation was associated with higher loneliness and isolation scores. While this might suggest a counterintuitive increase in perceived loneliness post-intervention, the effect size in Model 1 was modest. Age was consistently associated with lower loneliness and isolation scores, indicating that older participants tended to report less social disconnection. Participants identifying as female reported significantly higher loneliness and isolation in both models, as did those with more disabilities or chronic conditions. Disability and chronic condition counts remained strong positive predictors of loneliness and isolation across both models, suggesting higher social disconnectedness among participants with more chronic conditions and disabilities.

**Table 7: Results of Random Effects Models for Self-reported Loneliness**

Random Effects Models for Loneliness				
	Model 1		Model 2	
Time=Post	-0.036**	(0.012)	-0.196*	(0.092)
Participant: Age Today	-0.003***	(0.001)	-0.025*	(0.010)
<b>Race (Base=White)</b>				
American Indian or Alaska Native	0.219**	(0.079)	-0.979	(0.528)
Asian American	0.090**	(0.032)	-0.627	(0.811)
Black/African American	-0.140***	(0.030)	-0.145	(0.272)
Multi-Racial	0.102	(0.088)	0.775	(0.551)
Native Hawaiian or Pacific Islander	0.239	(0.164)		
Unknown	-0.011	(0.031)	-0.529	(0.449)
Non-Hispanic/Latino	0.063*	(0.026)	0.312	(0.372)
<b>Sex (Base=Male)</b>				
Female	0.045	(0.027)	0.138	(0.263)
Prefer not to say	0.066	(0.144)	0.176	(0.790)
Education	-0.001	(0.010)	-0.180	(0.147)
Completer=1	0.027	(0.020)	0.363	(0.293)
Disability Count	0.139***	(0.008)	0.251**	(0.077)
Chronic Conditions Count	0.070***	(0.004)	0.049	(0.043)
Non-Veteran	-0.063	(0.045)	0.006	(0.420)
<b>Program Delivery (Base=In-person)</b>				
Phone or Virtual	-0.124***	(0.029)		
Self-Directed	-0.230***	(0.049)		
Mixed w/In-person	-0.212*	(0.091)		
Mixed w/o In-person	-0.409**	(0.134)		
Monthly Income			0.160*	(0.064)
Constant	2.067***	(0.074)	2.908**	(0.978)
Observations	12,925		114	
Standard errors in parentheses * p<0.05, ** p<0.01, *** p<0.001				

# Results

Building on the findings from Table 5, Table 6 presents the results of two random effects regression models that specifically examine self-reported loneliness as a distinct outcome. In contrast to the previous models, both versions of the loneliness model indicate a decrease in loneliness following the CDSME program, with post-program participation significantly associated with lower loneliness scores. This suggests that while general perceptions of social disconnection (loneliness and isolation combined) may not uniformly improve, more targeted feelings of loneliness did decline for participants who completed the CDSME programs.

Age remained a consistent negative predictor of loneliness across models, indicating that older adults tended to report less loneliness. Disability and chronic condition counts were positively associated with loneliness in both models, with the effects remaining strong and statistically significant. These results reaffirm the vulnerability of individuals with higher health burdens to experiences of social disconnection. Interestingly, delivery format had a different impact on loneliness than on the combined outcome. In Model 1, participants in all alternative formats, including virtual, self-directed, and mixed formats, reported significantly lower loneliness than those in in-person formats. This contrasts with earlier models where virtual formats were associated with increased loneliness and isolation, suggesting a potential divergence in how different aspects of social connection are affected by program format.

Overall, the findings across Tables 5 and 6 suggest that while general feelings of loneliness and isolation may persist or even slightly increase post-program, specific feelings of loneliness appear to decrease following participation. The consistency of age, disability status, and chronic illness as key predictors across models highlights their central role in shaping social well-being outcomes. Differences in program delivery format and the unexpected income effects underscore the complexity of these relationships and suggest the need for further research to disentangle structural and individual factors influencing loneliness among older adults.

## 5.3 RETURN ON INVESTMENT ESTIMATION

### 5.3.1 CDSME Program Cost

To assess the economic value of the Chronic Disease Self-Management Education (CDSME) programs implemented between 2017 and 2024, a basic return on investment (ROI) analysis was conducted using available federal grant award data and participant counts. Due to the absence of detailed program-specific cost data from grantees, this analysis relied on total funding allocations as a proxy for overall program expenditure. Between 2017 and 2024, approximately \$50.7 million in federal grants were awarded to support the delivery of CDSME programs across grantee organizations. During the same period, 199,749 individuals were recorded in the Healthy Aging Programs Integrated Database (HAPID) as having participated in at least one CDSME workshop. By dividing the total investment by the number of participants, the estimated cost per participant is approximately \$254. This figure aligns with cost estimates reported in previous studies of CDSME implementation and provides a reasonable basis for evaluating the program's economic efficiency in the absence of granular cost reporting.

# Results

**Table 8: Program Cost**

Total Funding (2014 – 2024) <sup>30</sup>	Total Participants	Cost Per-Participant
\$50,702,037.00	199,749	\$253.83

## 5.3.2 COST SAVINGS OF CDSME

The healthcare utilization cost estimates summarized in Tables 8 and 9 provide a benchmark for evaluating potential healthcare savings associated with participation in Chronic Disease Self-Management Education (CDSME) programs. These figures are derived from peer-reviewed literature and health economics sources that estimate the annual cost of mental health care, particularly for conditions such as major depressive disorder (MDD), anxiety, and post-traumatic stress disorder (PTSD), conditions that CDSME programs have been shown to positively influence through improvements in self-efficacy, ability to set goals, and a stronger connection with their communities.<sup>31,32</sup> Given that the original cost estimates span from 2013 to 2021, all figures were updated to 2024 U.S. dollars using the Gross Domestic Product (GDP) Price Index to ensure consistency and relevance for economic analysis.

**Table 9: Healthcare Utilization Costs based on Literature**

Study	Cost Type (Year)	Estimated Cost	Cost in 2024 USD
Greenberg et al., (2023) <sup>33</sup>	Costs associated with MDD (2019)	\$6,429.00	\$7,445.00
Peterson-KFF Health Tracker (2021) <sup>34</sup>	Psychiatry (Office Based)	\$557.00	\$646.12
	Other Mental Health	\$347.00	\$402.52
	Office Visits/ Psychotherapy	\$1,507.00	\$1,748.12
	Total	\$2,411.00	\$2,796.76
Hohls et al., (2018) <sup>35</sup>	Anxiety disorder (2013)	\$5,153.00	\$6,801.96
	Post-traumatic stress syndrome (2016)	\$6,615.00	\$8,268.75

<sup>30</sup>Administration for Community Living, "Chronic Disease Self-Management Education Programs," ACL.gov, last modified March 4, 2025, <https://acl.gov/programs/health-wellness/chronic-disease-self-management-education-programs>.

<sup>31</sup>Marco Solmi et al., "Factors Associated With Loneliness: An Umbrella Review of Observational Studies," *Journal of Affective Disorders* 271 (June 15, 2020): 131–138.

<sup>32</sup>Sue E. Lawn, Maria A. Smith, and J. Hunter, "Mental Health Peer Support for People with a Psychiatric Illness: A Comprehensive Literature Review," *International Journal of Evidence-Based Healthcare* 5, no. 2 (2007): 151–160.

<sup>33</sup>Paul Greenberg, Abhishek Chitnis, Derek Louie, Ellison Suthoff, Shih-Yin Chen, Jessica Maitland, Patrick Gagnon-Sanschagrin, Andree-Anne Fournier, and Ronald C. Kessler, "The Economic Burden of Adults with Major Depressive Disorder in the United States (2019)," *Advances in Therapy* 40, no. 11 (2023): 4460–4479

<sup>34</sup>Cynthia Cox and Krutika Amin, "Privately Insured People with Depression and Anxiety Face High Out-of-Pocket Costs," *Peterson-KFF Health System Tracker*, last modified March 22, 2023, <https://www.healthsystemtracker.org/brief/privately-insured-people-with-depression-and-anxiety-face-high-out-of-pocket-costs/>.

<sup>35</sup>Johanna Katharina Hohls, Hans-Helmut König, Yulia I. Raynik, and André Hajek, "A Systematic Review of the Association of Anxiety with Health Care Utilization and Costs in People Aged 65 Years and Older," *BMC Geriatrics* 21, no. 1 (2021): 1–15

# Results

**Table 10: Summary of Healthcare Utilization Costs**

	Lowest	Mean	Highest
Mental Health Cost/Year	\$2,796.76	\$5,681.24	\$7,445.00

Table 8 compiles cost data from multiple sources, including Greenberg et al. (2023), the Peterson-KFF Health Tracker (2021), and Hohls et al. (2018). For instance, Greenberg and colleagues estimated the average annual cost for individuals with major depressive disorder at \$7,445, while Hohls et al. reported costs of \$6,802 and \$8,269 for anxiety and PTSD, respectively, after inflation adjustment. The Peterson-KFF Tracker data break down outpatient mental health expenditures by service type, reporting 2024-adjusted costs of \$646 for psychiatry, \$403 for other mental health visits, and \$1,748 for psychotherapy, with an overall annual total of \$2,797.

Table 9 synthesizes these estimates into a summary of healthcare utilization costs for adults experiencing mental health conditions relevant to the CDSME population. Annual costs range from a low of \$2,796 to a high of \$7,445, with an estimated mean of \$5,681. These figures offer a practical reference point for estimating cost offsets in economic evaluations of CDSME programs, where improvements in mental health could reduce reliance on high-cost services. By linking outcome improvements to these standardized cost benchmarks, analysts can estimate the financial returns associated with program participation.

While the healthcare utilization cost estimates presented in Tables 8 and 9 provide important economic context for evaluating the Chronic Disease Self-Management Education (CDSME) program, a key limitation of this analysis is the absence of direct healthcare utilization outcomes in the Healthy Aging Programs Integrated Database (HAPID). Specifically, the HAPID database currently does not collect data on hospitalizations, emergency room visits, or outpatient visits for CDSME participants. This omission restricts the analysis to mental health-related cost categories and precludes a more comprehensive estimation of cost savings across the broader spectrum of healthcare services that may be impacted by CDSME participation.

Without these additional data points, it is not possible to fully capture the potential downstream cost offsets associated with improved self-management of chronic conditions, such as reduced emergency care utilization or decreased inpatient admissions. As a result, the estimates derived here likely underrepresent the full economic value of the program. Despite this limitation, the application of conservative, literature-based cost estimates for mental health treatment still demonstrates the potential for meaningful financial returns, particularly in the context of improved self-efficacy and psychosocial outcomes observed among program participants. Future studies would benefit greatly from measures capturing a broader range of healthcare utilization outcomes.

# Results

### 5.3.3 Economic value of Outcome Improvements

Building on the outcome improvements documented through fixed effects regression models in Table 2 recaptured in Table 10, we estimate the potential economic savings on annual mental health expenditures associated with participation in Chronic Disease Self-Management Education (CDSME) programs. Results indicate meaningful improvements in participants' psychosocial outcomes, particularly in areas tied to mental health and chronic disease management. Self-reported general health rating improved from 2.53 to 2.69, and self-efficacy scores increased from 7.72 to 8.00. Loneliness rating also improved modestly, declining from 2.22 to 2.19, translating to an improvement of 0.04 points per participant. Although these improvements may appear modest, they are consistent with the intended impact of CDSME programs and have documented associations with reduced healthcare utilization in the literature.<sup>36,37,38</sup>

**Table 11: Key Outcome Improvement**

Variable	Mean (Pre)	Mean (Post)	Improvement	N
General Health	2.53	2.69	0.15	15,604
Self-Efficacy	7.72	8.00	0.28	18,028
Loneliness	2.22	2.19	0.04	6,447

Using avoided loneliness per participant as the core outcome and applying literature-based estimates of annual mental health treatment costs (adjusted to 2024 USD using the U.S. GDP Price Index), we calculated potential cost savings across three scenarios: conservative (Scenario 1), moderate (Scenario 2), and high-cost (Scenario 3). In Scenario 1, which applies the lowest annual cost estimate of \$2,796.76 per person with mental health needs, CDSME participation yields annual savings of approximately \$111.87 per participant. Multiplied across the 532,503 participants represented in the Healthy Aging Programs Integrated Database (HAPID), this results in a total cost savings of roughly \$59.6 million (Table 11). Scenario 2, using the average cost estimate of \$5,681.24, increases savings per participant to \$227.25 and projects a total savings exceeding \$121 million. Scenario 3, applying the highest annual cost estimate of \$7,445.00, generates a potential savings of \$297.80 per participant and total program savings of \$158.6 million.

<sup>36</sup>Kate Lorig et al., "The Components of Action Planning and Their Associations with Behavior and Health Outcomes," *Health Education & Behavior* 41, no. 1 (2014): 43–51

<sup>37</sup>Teresa J. Brady et al., "A Meta-Analysis of Health Status, Health Behaviors, and Health Care Utilization Outcomes of the Chronic Disease Self-Management Program," *Preventing Chronic Disease* 10 (2013): 120112

<sup>38</sup>Kate Lorig et al., "Evidence Suggesting That a Chronic Disease Self-Management Program Can Improve Health Status While Reducing Hospitalization: A Randomized Trial," *Medical Care* 37, no. 1 (1999): 5–14.

# Results

**Table 12: Cost Savings Estimates**

Scenarios	Avoided Per Participant	Cost	Savings Per participant	Total Savings N=532,503
Scenario 1 (Lower)		\$2,796.76	\$111.87	\$59,571,323.61
Scenario 2 (Mean)	0.04	\$5,681.24	\$227.25	\$121,011,093.75
Scenario 3 (Upper)		\$7,445.00	\$297.80	\$158,579,393.40

**Table 13: Net Benefit Estimates**

Scenarios	Total Savings N=532,503	Total Program Cost	Net Benefit
Scenario 1 (Lowest)	\$59,571,323.61	\$50,702,037.00	\$8,869,286.61
Scenario 2 (Mean)	\$121,011,093.75		\$70,309,056.75
Scenario 3 (Highest)	\$158,579,393.40		\$107,877,356.40

As detailed in Table 12, the estimated net economic benefit under Scenario 1 (after subtracting the total CDSME program cost of \$50.7 million) is approximately \$8.9 million. Under Scenario 2, net savings rise to over \$70 million, and under the most generous assumptions in Scenario 3, the net benefit exceeds \$107 million. These results suggest a positive return on investment for CDSME programs when considering mental health-related cost offsets alone.

It is important to emphasize that these estimates likely understate the full economic value of CDSME participation. Key health-related outcomes such as general health and self-efficacy, both of which showed statistically significant improvements, are not easily monetized and are thus excluded from these calculations. Moreover, due to data limitations within HAPID, this analysis does not incorporate healthcare utilization outcomes such as emergency room visits, hospitalizations, or outpatient care, which are often reduced as individuals gain greater confidence and skills in managing their health conditions. As a result, the presented savings represent only a partial estimate of the true return on investment.

## 6.1 POLICY IMPLICATIONS

The findings from this report present compelling evidence that Chronic Disease Self-Management Education (CDSME) programs offer measurable benefits to individuals and yield significant potential savings in healthcare expenditures, particularly Medicare and Medicaid which together bear a significant share of the costs associated with managing chronic conditions and mental health comorbidities among older adults. Through statistically significant improvements in self-rated general health, self-efficacy, and loneliness, CDSME demonstrates value not only due to the clinical outcomes to program participants, but also as a great fiscal public health policy. The multivariate analysis showed that CDSME participation led to improvements in general health, self-efficacy and self-reported loneliness, even after controlling for key demographic and health characteristics. Although direct healthcare utilization data (e.g., emergency department and hospitalization rates) were not available in HAPID for this analysis, robust literature and past national evaluations consistently link self-efficacy and health status gains to reductions in healthcare utilization.<sup>39,40</sup>

Loneliness is a known risk factor for depression, anxiety, and stress-related disorders, all of which drive substantial direct and indirect healthcare costs. Studies have shown that individuals with high levels of loneliness are more likely to develop clinical depression, experience worsened chronic disease outcomes, and overutilize mental health services.<sup>41</sup> By reducing loneliness, CDSME programs can meaningfully lower these treatment costs. Based on conservative modeling, this report estimates that CDSME generates between \$59.6 million and \$158.6 million in mental health-related savings, depending on the cost scenario applied. These savings translate into a net benefit ranging from \$8.9 million to over \$107 million, even after accounting for the full cost of program implementation between 2017 and 2024. These estimates reflect only a fraction of CDSME's potential value, as they are based solely on improvements in loneliness which is a proxy indicator for reduced mental health service use. Importantly, the actual savings are likely to be much higher if reductions in emergency care, hospital admissions, and other healthcare services were fully accounted for.

Chronic diseases are the leading drivers of increasing the nation's health care cost burden of \$4.5 trillion annually with 93% of adults 65 and older having at least one chronic condition, and nearly 80% with two or more.<sup>42</sup> Cost burden on federal healthcare spending through Medicare and Medicaid stand to benefit significantly from reduced hospital admissions and emergency department visits resulting from CDSME programs. Improvements in self-management can help delay disease progression, reduce acute events, and lessen the need for high-cost interventions, all of which contribute to long-term healthcare cost savings. Expanding access to in-person formats and addressing delivery barriers (e.g., broadband, digital literacy) could enhance outcomes across vulnerable populations and further maximize return on federal investments.

In sum, the study highlights the following policy implications for policymakers:

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<sup>39</sup>Marcia G. Ory et al., "Successes of a National Study of the Chronic Disease Self-Management Program: Meeting the Triple Aim of Health Care Reform," *Medical Care* 51, no. 11 (2013): 992–998.

<sup>40</sup>Kate Lorig et al., "Internet-Based Chronic Disease Self-Management: A Randomized Trial," *Medical Care* 44, no. 11 (2006): 964–971.

<sup>41</sup>Julianne Holt-Lunstad, Timothy B. Smith, Mark Baker, Tyler Harris, and David Stephenson, "Loneliness and Social Isolation as Risk Factors for Mortality: A Meta-Analytic Review," *Perspectives on Psychological Science* 10, no. 2 (2015): 227–237.

<sup>42</sup>National Council on Aging. "Get the Facts on Chronic Disease Self-Management." Last modified 2023. <https://www.ncoa.org/article/get-the-facts-on-chronic-disease-self-management/>

# Discussion

1. Sustain and expand federal funding for CDSME programs under ACL's Evidence-Based Programs portfolio. Funding should reflect the program's dual role in improving health and curbing preventable healthcare spending.
2. Integrate CDSME into Medicaid waivers incentivizing states and plans to include CDSME as a reimbursable, evidence-based intervention under Section 1115 Medicaid waivers, D-SNP models, and Medicare Advantage supplemental benefits.
3. Strengthen data infrastructure to capture key healthcare utilization indicators and program related costs. To enable more comprehensive and accurate economic analyses, future investments should prioritize enhancements to the HAPID system, including the integration of core utilization questions into the survey. This would allow analysts to quantify downstream cost savings more precisely and fully capture the return on investment of CDSME programs.

In sum, CDSME programs represent a high-value, low-cost public health intervention with demonstrable benefits for individuals, communities, and federal health systems. As the U.S. population ages and the burden of chronic disease intensifies, investing in programs that build self-efficacy, improve health, and reduce costs is not just prudent, it is essential.

## 6.2 LIMITATIONS OF INTERPRETATIONS OF THE RESULTS

While this analysis provides valuable insights into the effectiveness and economic potential of Chronic Disease Self-Management Education (CDSME) programs, several limitations should be acknowledged when interpreting the results.

1. **Lack of Direct Healthcare Utilization Measures:** A major limitation of the current analysis is the absence of direct healthcare utilization indicators, such as emergency room visits and hospitalizations, in the CDSME pre-post survey instrument. These are critical drivers of Medicare and Medicaid costs and central to evaluating the full financial impact of chronic disease self-management. Their omission limits the scope of the return-on-investment (ROI) assessment.
2. **Limited Cost Data from Grantees:** Cost estimation relied on aggregate federal funding allocations due to a lack of detailed, program-level expenditure data from grantees who implemented CDSME between 2017 and 2024. This limits the precision of per-participant cost estimates and may obscure important variations in delivery efficiency across sites.
3. **Missing and Incomplete Data:** The analysis was further constrained by high levels of missing data across several key outcome variables. Incomplete follow-up responses reduced the number of valid paired observations, which could introduce bias and reduce the generalizability of the findings.
4. **Reliance on Self-Reported Outcomes:** All outcome measures in the dataset are self-reported, which introduces the possibility of recall bias and social desirability bias. Participants may overstate improvements in areas like health status or self-efficacy due to the structure of the program or perceived expectations.

Despite these limitations, the analysis offers a conservative yet meaningful estimate of CDSME's potential value, particularly with respect to improvements in self-efficacy, general health, and loneliness. Future evaluations would benefit from more robust data infrastructure, including standardized utilization metrics, comprehensive cost tracking, and claims data integration to enable a fuller understanding of the program's clinical and economic impact.

# Conclusion

This report presents compelling evidence that Chronic Disease Self-Management Education (CDSME) programs yield meaningful improvements in participant health outcomes while offering substantial potential for cost savings to federal healthcare expenditures. Participants demonstrated statistically significant gains in general health and self-efficacy, as well as reductions in loneliness, outcomes that are strongly linked to better chronic disease management, reduced mental health burden, and lower healthcare utilization. The estimated return on investment, even when limited to conservative assumptions and only mental health cost offsets, ranges from \$8.9 million to over \$107 million in net savings, underscoring the economic value of continued support for CDSME.

These findings hold important implications for Medicare and Medicaid, which collectively cover millions of older adults and individuals with chronic and mental health conditions. By improving psychosocial resilience and empowering individuals to better manage their health, CDSME can reduce dependence on costly services such as emergency room visits, hospitalizations, and mental health treatment. Moreover, the program's community-based, peer-led delivery model aligns with federal goals of advancing health education, improving care quality, and lowering overall system costs.

Nonetheless, the full fiscal and clinical impact of CDSME is likely understated due to data limitations including the absence of healthcare utilization metrics, incomplete cost reporting, and reliance on self-reported outcomes. Addressing these gaps through enhanced data infrastructure and integration with Medicare and Medicaid claims will be critical to capturing more robust program value.

As the U.S. population ages and the burden of chronic disease intensifies, scalable, evidence-based interventions like CDSME will be essential to sustaining the health and financial viability of our healthcare system. Continued investment, policy integration, and targeted expansion of CDSME can strengthen individual self-management capacity, improve population health, and generate cost savings that benefit individuals, communities, and federal health programs alike.

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