MISSION ANALYTICS GROUP, INC.

Evaluation of Complementary and Integrative Health Services (CIHS) in the Colorado Medicaid Program: Final Report

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EXECUTIVE SUMMARY

Colorado's Medicaid program, administered by the Department of Health Care Policy and Financing (HCPF), is one of the few in the nation that covers Complementary and Integrative Health Services (CIHS) for individuals receiving home and community-based services (HCBS). The Spinal Cord Injury (SCI) waiver provides massage, acupuncture, and chiropractic services to individuals with a spinal cord injury. In addition, HCPF offers massage services in the Supported Living Services (SLS) waiver, which supports people with intellectual or development disabilities.[1]

CIHS aims to improve the wellbeing of individuals who experience mobility issues, often coupled with chronic pain, and generate cost savings for the state through reductions in other health care expenditures. Mission Analytics Group, Inc., was contracted by HCPF in 2020 to evaluate the impact of CIHS on Medicaid costs and participants' health and wellbeing through the analysis of Medicaid claims, survey, and interview data.

The costs of CIHS appear to be at least partially offset by reductions in other health care expenditures, though these findings are not statistically significant.

Through two difference-in-differences analyses, one for SCI waiver participants and one for SLS waiver participants, Mission compared the Medicaid costs for individuals with CIHS to individuals without CIHS with similar health conditions. Costs were compared across four quarters prior to the first CIHS service (i.e., the intervention) and 12 quarters after.

Costs for the intervention and comparison groups remain relatively similar post-intervention. However, there is evidence that CIHS costs are partially offset by reductions in other health care costs, although these findings are not statistically significant.

- **SCI waiver participants:** Prior to the intervention, quarterly costs for the SCI intervention group were about $1,100 higher than costs for the comparison group. This difference drops to about $850 after the intervention. Given that the additional average quarterly cost of CIHS for the intervention group is $700, this result suggests that CIHS costs are partially offset by reductions in other costs. However, the findings from this analysis are not statistically significant. For overall Medicaid costs, the estimated impact suggests that costs for the intervention group rose by $199 less than for the comparison group, but the 95% confidence interval for the

[1] Massage is also offered in three children's waivers: Children's Extensive Support (CES), Children's Habilitation Residential Program (CHRP), and Children with Life-Limiting Illness (CLLI) waivers.

estimate shows that the effect could fall between $2,058 lower for the intervention group to $1,659 higher.

- **SLS waiver participants:** Following the intervention, costs appear to rise more quickly for the intervention group. However, after about two years, costs begin to converge for the two groups. The estimated effect on overall costs is -$125, meaning the cost increase in the intervention period was $125 lower for the intervention group relative to the comparison group. However, once again, these findings are not statistically significant, and the 95% confidence interval shows that the actual effect could fall between -$1,221 and $970.

The analysis has relatively small samples of individuals in the intervention groups, meaning the treatment effect would need to be quite large to establish statistical significance. As more SCI and SLS waiver participants access CIHS over time, we can examine larger samples and improve the reliability of estimated effects.

According to participant surveys and interviews, the greatest benefit of CIHS is reducing pain.

Survey respondents and interviewees reported that CIHS reduced their pain, with 85% of both SCI and SLS survey respondents reporting significant or moderate improvement. SCI waiver participants often complained of the tension created by being in a wheelchair. One interviewee indicated that because he lacks any "capability in the lower body," the upper body experiences stress and tension. A caregiver of an SLS user who suffered from a broken foot that never healed correctly indicated that her daughter ended up in a wheelchair in severe pain. CIHS play a crucial role in relieving their tension and discomfort. This reduction in pain was reported to alleviate stress and anxiety and improve sleep:

> *"I definitely get the pain of an office job, but [the service] definitely cut back Tylenol or oxycodone that I would take when I would come home from work. It just alleviates a lot of pain throughout the week." – SCI waiver participant*

Individuals who use CIHS in the SCI waiver also tend to have higher quality of life scores, as calculated through the EQ-5D-5L, than those who do not. Pain is the likely driver of this relationship. For SCI participants, 67% of CIHS users reported that having low to moderate pain, compared to 43% of non-users. When controlling for type of injury, date of onset, and social support, there was a statistically significant relationship between CIHS usage and pain for SCI participants (p = .028), but not for overall quality of life. The relationship is less clear for SLS participants.

Participants reported that overall access to CIHS was mostly good, though there were some barriers.

While survey respondents and interviewees reported relatively few challenges, some faced CIHS access issues. A handful of respondents reported delays enrolling in the SCI waiver due to complex diagnoses or lack of case worker guidance. In addition, because most SLS and SCI waiver participants do not drive themselves, they rely on Medicaid or public transportation to access CIHS, which can be unreliable and inconvenient given the location of CIHS providers. The COVID-19 pandemic has also created access barriers, with several respondents reporting that they were unsure of how to schedule CIHS appointments now that they are ready to return to treatment. Finally, interviewees reported that there are not enough providers to serve this population, likely due to lower Medicaid reimbursement rates than in private settings and provider employment disruptions due to COVID-19.

Given the indication of CIHS' positive benefits without large state investments, HCPF may consider the following to improve CIHS access:

- Expand the reach of the SCI waiver beyond the Denver Metro area to grant individuals with spinal cord injuries in the rest of the state access to CIHS.
- Attract more providers through outreach and higher rates.
- Train and reorient case workers on available service providers and strategies for accessing services.

INTRODUCTION

Colorado's Medicaid program is one of the few in the nation that covers Complementary and Integrative Health Services (CIHS) for individuals receiving home and community-based services (HCBS). The Spinal Cord Injury (SCI) waiver, administered by the Department of Health Care Policy and Financing (HCPF), was approved by the state legislature in 2009 and implemented in 2012 to provide massage, acupuncture, and chiropractic services to individuals with spinal cord injury who were enrolled in the Elderly, Blind, and Disabled (EBD) waiver at the time. Individuals with more recent injuries enroll directly in the SCI waiver to receive CIHS. In addition, HCPF offers massage services through the Supported Living Services (SLS) waiver, which supports people with intellectual or development disabilities.[2] CIHS complements other services offered through waivers that allow participants to stay in their homes and communities, such as home modifications and personal care.

Table 1: Snapshot of Adult Waivers that Offer CIHS

	SCI Waiver	SLS Waiver
Population	People with spinal cord injury	People with intellectual or development disabilities
Level of care	Significant functional impairment	Intermediate Care Facility for Individuals with Intellectual Disabilities
Service reach	Denver Metro Area	Statewide
CIHS offered	Massage, acupuncture, and chiropractic services	Massage

While CIHS are promoted by advocates to improve the wellbeing of individuals who experience mobility issues that are often combined with chronic pain, they are also intended to provide financial benefits to the state. Through improved participant health, the state aims to see reductions in other health care expenditures.

Mission Analytics Group, Inc., was contracted by HCPF in 2020 to design and conduct an evaluation of CIHS that considers cost savings and impact on participants' health and wellbeing. The evaluation design builds off a previous evaluation implemented by the National Research Center, Inc., with input from members of the SCI Advisory Committee and Dr. Patricia Herman of the RAND Corporation.

[2] Massage is also offered in three children's waivers: Children's Extensive Support (CES) waiver, Children's Habilitation Residential Program (CHRP) waiver, and Children with Life-Limiting Illness (CLLI) waiver.

The evaluation answers the following research questions:

1. What are the patterns of CIHS use among SCI and SLS waiver participants?
2. Are CIHS associated with lower health care costs?
3. Are CIHS related to better quality of life scores?
4. How do participants perceive the benefits of CIHS?
5. What challenges do participants face in accessing CIHS?

This report presents findings from the evaluation conducted for the state's fiscal year (FY) 2020. Section 1 presents the evaluation methodology, including a description of its three data sources: Medicaid administrative data, survey data, and interviews. Section 2 reports the findings by research question, and the report concludes with considerations for HCPF to support CIHS access related to waiver enrollment and reducing barriers to care.

1. METHODOLOGY

The evaluation answers the research questions through three main data sources: Medicaid administrative data, survey data, and interviews (Table 2). These sources and related analytical methods are described below.

Table 2: Research Question by Data Source

Research Question	Medicaid Data	Surveys	Interviews
What are the patterns of CIHS use?	✔		
Are CIHS associated with lower health care costs?	✔		
Are CIHS related to better quality of life scores?	✔	✔	
How do participants perceive the benefits of CIHS?		✔	✔
What challenges do participants face in accessing CIHS?		✔	✔

A. Medicaid and Assessment Administrative Data

To evaluate the impact of CIHS on Medicaid costs, we use a difference-in-differences method that compares cost outcomes for an intervention group and a comparison group before and after starting CIHS.

Data Sources

The difference-in-differences method relies on Medicaid claims data, information from waiver intake forms that are completed upon waiver enrollment, and service levels assigned to those with SLS waivers. The Medicaid claims data span from July 2012 through September 2020 and consist of quarterly costs by service category for SCI, EBD, and SLS waiver participants. The assessment data include diagnoses, SLS service levels, gender, and birth year for these individuals.

Creation of Intervention and Comparison Groups

For each of the SCI and SLS waivers, we first create an intervention group and a comparison group. By comparing similar individuals with different CIHS patterns of usage over time, we can better establish a relationship between CIHS and health care costs. The intervention groups for the SCI and SLS waivers consist of individuals with CIHS in their Medicaid claims. Individuals in the comparison group are matched to individuals in the intervention group based on:

- *Health condition*: For the SCI comparison group, we matched EBD waiver participants on SCI diagnoses or diagnoses for quadriplegia or paraplegia on the intake forms. For the SLS comparison group, we matched SLS waiver participants without massage services on the service level.

- *Dual eligibility status (both Medicare and Medicaid)*: Given that Medicare pays for some health care services, we matched on insurance status to ensure cost comparability.
- *Existence of inpatient claims in the quarter prior to the intervention*: Inpatient claims explain much of the variability of costs. Therefore, matching on the presence rather than the actual costs of these types of claims in quarters prior to the intervention helps ensure that pre-intervention trends are similar for both the intervention and comparison groups.
- *CIHS start dates*: Because CIHS start dates for the intervention group range over several years, we also matched on the intervention periods, so the comparison groups are subject to the same time-varying effects as the intervention group.

The intervention and comparison groups are also restricted to individuals with four sequential quarters of claims data to establish a pre-intervention trend and 12 sequential quarters following the first intervention quarter to establish a post-intervention trend.

We identified 42 individuals in the SCI intervention group and matched them to 74 EBD waiver participants with similar characteristics. We identified 45 individuals in the SLS waiver who accessed massage services and matched them with 88 other SLS waiver participants.

Outcomes

For the intervention and comparison groups, we compared all Medicaid costs and costs for each of the following categories: waiver services, primary care, pharmacy, outpatient, inpatient, emergency department, emergency medical services, skilled home health, and nursing facility.

Analysis

The difference-in-differences method allowed us to compare pre- and post-intervention outcomes for the treatment and comparison groups to identify an average treatment effect on the treated (ATET). By comparing outcomes across groups and over time, the model eliminates time-invariant effects between the two groups and time-varying unobservable effects experienced by both groups. It cannot account for unobserved effects that occurred to the comparison group during the intervention; however, the fact that the four-quarter intervention period varies by individual should mitigate any potential bias in this regard. The ATET captures changes experienced by the intervention group unrelated to trends prior to the intervention and factors that influence both groups during the intervention period.

B. Surveys

SCI waiver participants and SLS waiver participants who receive massage services completed surveys in March and April 2021 to provide information on their health and wellbeing and their perceptions of service impact.

Content

The survey (Appendix A) has four main sections:

1. *Background*: This section captures characteristics that may impact participants' health, wellbeing, and use of CIHS, including injury or diagnosis, source of income, living situation, and social support.
2. *Quality of Life*: The EQ-5D-5L, an internationally validated survey, was used to assess quality of life. This survey has five domains: pain, anxiety, self-care, usual activities, and mobility, with participants indicating severity by choosing from a range of five options ranked from least to most severe.
3. *Perceptions of Impact of CIHS*: Individuals who received CIHS reported how they believed CIHS impacted their pain and energy levels, negative feelings (e.g., anxiety and depression), ability to work or volunteer, and health care utilization.
4. *Satisfaction with CIHS*: The final section of the survey allowed participants to report information on how they learned about the SCI waiver, the ease of acquiring the SCI waiver, and barriers to obtaining services and attending appointments. In addition, for each type of CIHS (massage, chiropractic services, and acupuncture), participants rated appointment availability, quality of service, and safety and comfort at the service site. The SLS waiver has a much longer history than the SCI waiver, so questions on waiver enrollment were not included in the SLS survey.

Each respondent was assigned an identifier that could be linked back to Medicaid administrative data.

Respondents

Individuals completed the survey online, on paper, or over the phone. Of the 256 individuals with the SCI waiver, 81 completed the survey (32%). Of the 448 individuals with the SLS waiver who received massage services since 2012, 107 completed the survey (24%). About half the SCI waiver survey respondents had been injured within the last decade, and over half had injuries that resulted in quadriplegia. The vast majority of survey respondents for both the SCI and SLS waivers reported Supplemental Security Income (SSI) or Social Security Disability Insurance (SSDI). SCI waiver respondents were more likely to live alone, but both groups reported high levels of social support.

Survey respondents are comparable to the overall SCI waiver participants and SLS waiver participants who use massage. As presented in Table 3, SCI respondents and non-respondents had similar patterns of CIHS service utilization and overall Medicaid costs. However, while SCI waiver respondents had slightly higher costs than non-respondents for both CIHS and Medicaid overall, SLS waiver respondents had slightly lower costs. These general similarities indicate that the survey responses are representative of the overall population.

Table 3: Quarterly Medicaid Costs, Comparison of Survey Respondents to Non-Respondents, 2012–2020, in 2021 Dollars

	Average Quarterly CIHS Costs	Average Quarterly Total Medicaid Costs
SCI Waiver Participants		
Respondents (N = 81)	$685	$18,959
Non-Respondents (N = 175)	$516	$17,891
SLS Waiver Participants		
Respondents (N = 107)	$469	$16,213
Non-Respondents (N = 341)	$494	$17,047

Analysis

Mission used the survey findings to present information on perceptions of service benefits and issues with service access. In addition, a cross-sectional analysis assessed whether differences in quality of life outcomes were associated with CIHS use. This cross-sectional analysis took into consideration other factors that may influence health and wellbeing identified in the survey and Medicaid administrative data, such as level of social supports, Medicaid service level for SLS waiver participants, and type of and time since injury for SCI waiver participants. The Medicaid service level was identified through Medicaid administrative data, while level of social supports and type of and time since injury for SCI waiver participants came from the surveys.

C. Interviews

Twelve SCI waiver participants and SLS waiver participants who receive massage services participated in in-depth phone interviews in April 2021 to capture information on the perceived impact of CIHS on physical and mental health, health behaviors (e.g., sleep), and facilitators and barriers to accessing services (e.g., transportation, appointment availability). The goal of these interviews was to provide HCPF with a clearer picture of the use of, benefits of, and barriers to CIHS.

To select interviewees, we included a question in the survey on willingness to participate. Within the universe of respondents who agreed, Mission manually selected individuals,

including both men and women and individuals with a range of ages, varying degrees of injury severity and onset date, and different CIHS utilization patterns (e.g., those who use services on a weekly basis, those who initially used CIHS and stopped, and those who use services periodically). Appendix B contains the interview protocol for SCI waiver participants.

2. FINDINGS

CIHS users tend to have higher quality of life scores, primarily driven by a reduction in pain, and report that this relief improves their mobility and mental health. An analysis of costs in Medicaid claims indicates that CIHS costs are partially offset by reductions in other health care expenditures, but these findings are not statistically significant.

A. What Are the Patterns of CIHS Use?

Of the 256 individuals who enrolled in the SCI waiver from 2012 to 2020, roughly two-thirds (170) used Medicaid-funded CIHS. Nearly all CIHS users with an SCI waiver accessed massage services (Table 4). The second most common service was acupuncture, with 148 users, while just under half of those with an SCI waiver accessed chiropractic services. A total of 448 individuals with an SLS waiver accessed massage services between 2013 and 2020. On average, SCI waiver participants utilized $655 of CIHS a quarter, compared to $477 for SLS participants.

Table 4: Quarterly CIHS Utilization and Costs, 2012–2020, in 2021 Dollars

Service	Participants with Any Service	Avg. Quarterly Units	Quarterly Costs		
			Mean	Median	Std. Deviation
All CIHS for SCI Participants	170	39	$655	$641	$402
Massage	169	22	$313	$249	$214
Acupuncture	148	15	$280	$96	$124
Chiropractic	125	6	$136	$326	$184
Massage for SLS Participants	448	24	$447	$306	$530

For individuals in the SCI intervention group, CIHS utilization was fairly consistent or declined slightly in the two years following their first quarter accessing services, with average quarterly costs of about $700 (Figure 1). Massage and acupuncture services each account for about 40% of CIHS costs, at about $300 a quarter for each, and chiropractic costs are about $100 per quarter for this group. For the SLS intervention group, we observed a gradual decline in the use of massage. The average quarterly cost for massage services was about $650 for the first year and dropped to about $500 in the subsequent eight quarters (Figure 2). These trends can be explored in future evaluations.

Figure 1: Quarterly CIHS Costs for SCI Intervention Group, in 2021 Dollars

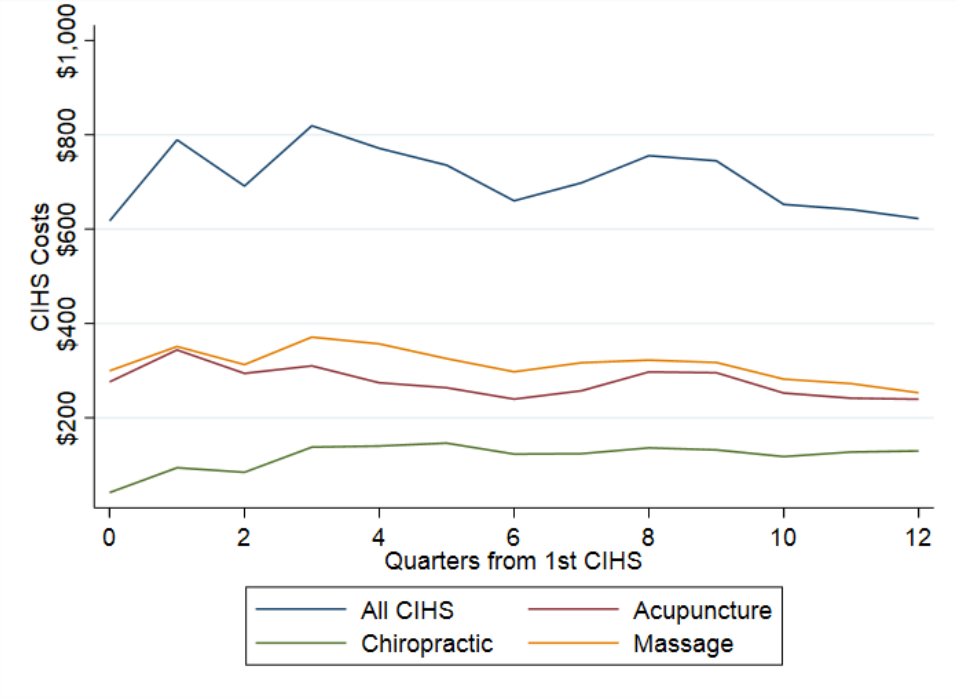
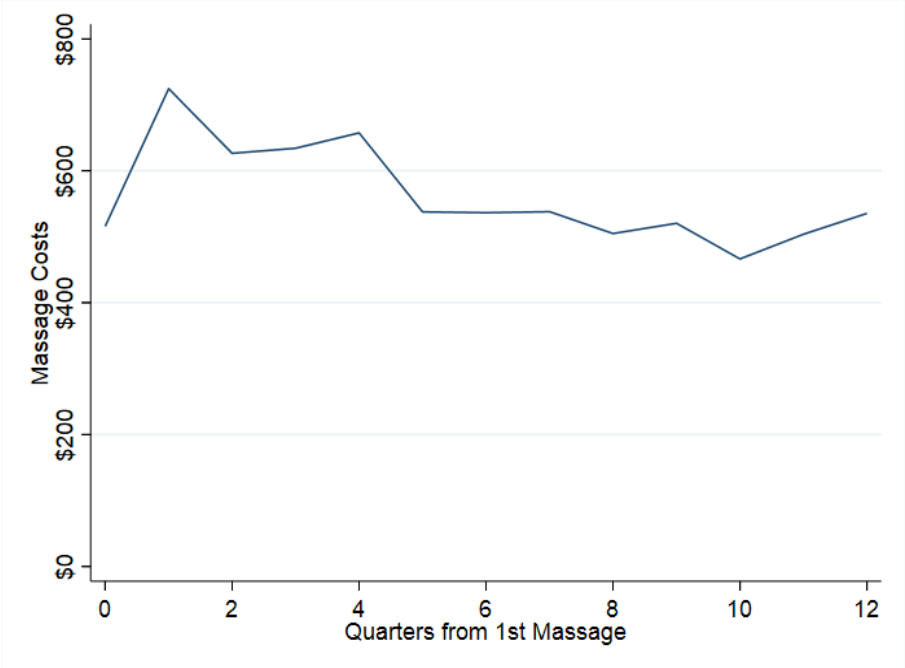


Figure 2: Quarterly Massage Costs for SLS Intervention Group, in 2021 Dollars



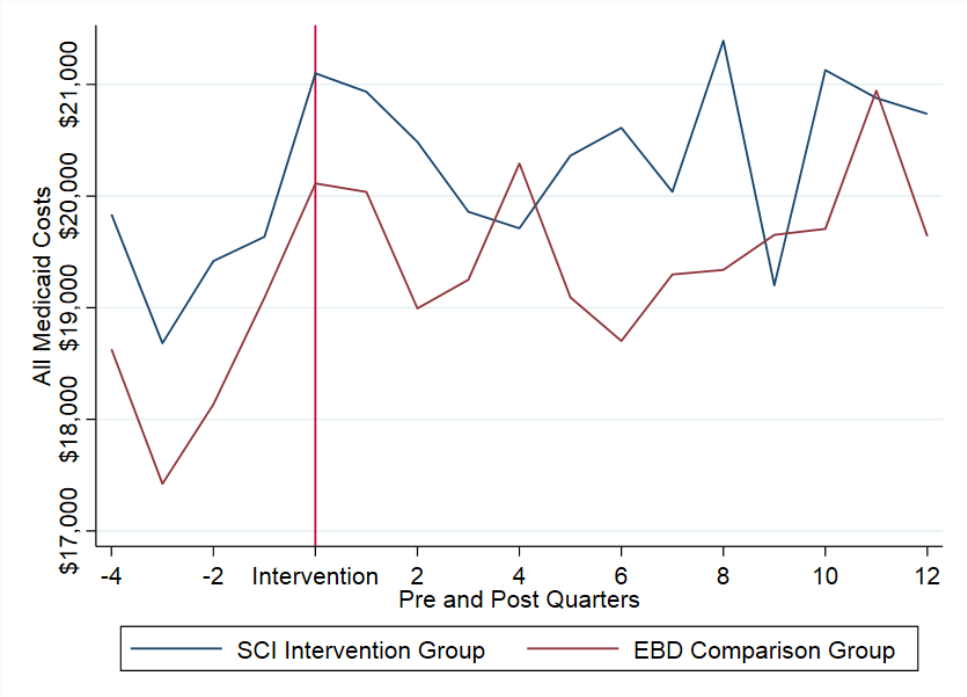
B. Are CIHS Associated with Lower Health Care Costs?

Post-intervention costs for both intervention and comparison groups stayed relatively similar. However, there is evidence, primarily for the SCI intervention group, that the costs of CIHS are partially offset by reductions in other health care costs, although these findings are not statistically significant.

SCI Waiver Participants

Prior to the intervention (i.e., first CIHS service), costs were rising by about $2,000 for both the intervention and comparison groups. Costs remained largely constant for each group following the intervention (Figure 3).[3] Whereas costs were about $1,100 higher per quarter for the SCI intervention group prior to the intervention, the difference drops to about $850 after the intervention, with each group showing average quarterly Medicaid costs of around $20,000. Given that the additional average quarterly cost of CIHS for the intervention group is $700, this figure suggests that CIHS are partially offset by reductions in other costs.

Figure 3: Average Quarterly Medicaid Costs for the SCI Intervention Group and EBD Comparison Group



Costs go down in all categories in the SCI intervention group, except waiver costs, whereas costs go up for most categories in the comparison group (Table 5). The biggest drop in

[3] Difference-in-differences methods require parallel trends in the pre-intervention period between the intervention and comparison groups, which is clearly shown in Figure 3.

costs was observed in outpatient and skilled home health costs, showing average quarterly cost drops of $1,585 for outpatient services ($6,189 to $4,604) and $1,250 for skilled home health ($4,056 to $2,806). The comparison group showed drops in the same categories, although they were not as large as those in the SCI intervention group.

Table 5: Average Pre- and Post-Intervention Quarterly Costs by Cost Category for the SCI Intervention Group and Comparison Group

Costs	Intervention Group		Comparison Group	
	Pre-Intervention Costs	Post-Intervention Costs	Pre-Intervention Costs	Pre-Intervention Costs
All Medicaid	$19,393	$20,445	$18,319	$19,580
Waiver	$9,725	$13,413	$11,203	$13,738
Primary Care	$87	$61	$47	$49
Pharmacy	$298	$281	$325	$255
Outpatient	$6,189	$4,604	$4,951	$3,849
Inpatient	$709	$53	$395	$210
Emergency Department	$53	$37	$30	$13
Emergency Medical Services	$180	$116	$110	$82
Skilled Home Health	$4,056	$2,806	$3,750	$2,773
Nursing Facility	$22	$0	$0	$0

Table 6 presents the estimated treatment effects for each of the Medicaid cost categories. The effects are in dollars, and a negative effect means that either the increases in costs were lower for the intervention group (as is the case for all Medicaid costs) or that costs decreased more for the intervention group (as with skilled home health). Positive effects mean that costs increased more or that costs decreased less for the intervention group (as with pharmacy costs). We found an estimated negative treatment effect for most of the Medicaid cost categories; however, we did not find a statistically significant effect in any category, as the 95% confidence interval ranges from negative to positive for each effect. For overall Medicaid costs, the estimated impact suggests that costs rose less by -$199 for the intervention group, but the 95% interval shows that the effect could fall between -$2,058 and $1,659.

Table 6: Treatment Effect for Each Cost Category, SCI Waiver

Costs	Treatment Effect	95% Confidence Interval
All Medicaid	-$199	[-$2,058 $1,659]
Waiver Services*	--	--
Primary Care	-$26	[-$54 $2]
Pharmacy	$43	[-$177 $204]
Outpatient	-$432	[-$2,224 $1,359]

Costs	Treatment Effect	95% Confidence Interval
Inpatient	-$513	[-$1,285 $260]
Emergency Department	$2	[-$37 $40]
Emergency Medical Services	-$45	[-$129 $39]
Skilled Home Health	-$484	[-$1,772 $1,299]
Nursing Facility	-$21	[-$64 $21]

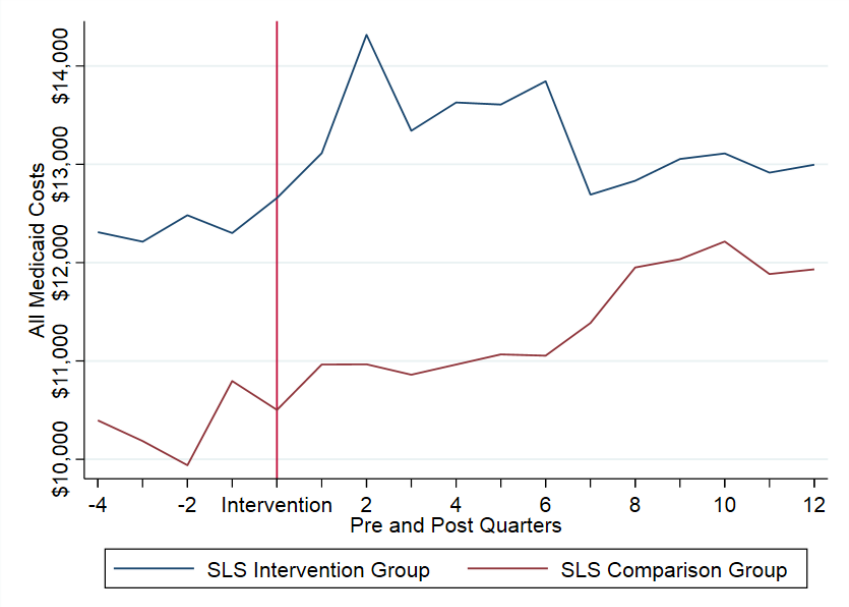
** For waiver services, the model indicated a positive effect (i.e., an increase in costs for the intervention group relative to the comparison group), but the parallel trend assumption is violated for this cost category, with costs declining for the SCI intervention group in the pre-intervention period and costs increasing in the pre-intervention period for the comparison group.*

While the lack of statistical significance for any of the cost categories precludes us from making a definitive statement about the impact of CIHS on Medicaid costs, the pattern of estimated effects suggests that CIHS costs are partially offset by declines in other costs, and while the results do not conclusively indicate cost reductions, they also do not find evidence of cost increases.

SLS Waiver Participants

For the SLS waiver participants, the intervention and control groups show parallel trends and relatively flat costs in the pre-intervention period, with the average quarterly costs of the intervention group $2,000 above the comparison group (Figure 4). Following the intervention, costs appear to rise more quickly for the intervention group. However, after about two years, costs begin to converge for the two groups.

Figure 4: Average Quarterly Medicaid Costs for the SLS Intervention Group and Comparison Group



Costs increase for all Medicaid cost categories for both groups, except for Emergency Department services for the comparison group (Table 7). The increases, however, are on average higher for the comparison group than the intervention group. Overall costs increased by $961 for the intervention group (from $12,327 to $13,228) compared to $1,111 for the comparison group (from $10,329 to $11,440). The biggest difference in the increase in costs between the two groups occurred in pharmacy costs, with the comparison group showing a $493 increase (from $1,085 to $1,578), compared to only a $55 increase for the intervention group (from $527 to $582).

Table 7: Average Pre- and Post-Intervention Quarterly Costs by Cost Category for the SLS Intervention Group and Comparison Group

Costs	Intervention Group		Comparison Group	
	Pre-Intervention Costs	Post-Intervention Costs	Pre-Intervention Costs	Post-Intervention Costs
All Medicaid	$12,327	$13,288	$10,329	$11,440
Waiver*	$3,580	$4,556	$4,123	$4,624
Primary Care	$41	$56	$41	$56
Pharmacy	$527	$582	$1,085	$1,578
Outpatient	$6,690	$6,860	$4,119	$4,389
Inpatient	$7	$101	$0	$53
Emergency Department	$9	$9	$17	$14
Emergency Medical Services	$50	$75	$62	$77
Skilled Home Health	$4,765	$5,061	$3,906	$4,262
Nursing Facility	$0	$0	$0	$0

** The largest cost increase for both groups occurred in waiver services. Although the cost increase for the intervention group was above the average costs associated with massage services, the overall cost increase was lower than in the comparison group.*

The estimated impact was mixed across the different cost categories, with about half showing an estimated positive impact on costs and the other half showing a negative impact on costs. However, the estimate for overall costs is -$125, meaning costs were $125 lower relative to the cost increase for the comparison group (Table 8). We only observe one statistically significant impact for waiver service costs. This cost impact is approximately the average quarterly cost for massage services. Prior to the intervention, the comparison group exhibited waiver service costs that were about $500 above the costs of those in the intervention group. The model suggests that the intervention increased waiver service costs for the intervention group to the level of the comparison group. While we see an increase in waiver service costs, the model suggests that these costs are offset elsewhere, but the lack of statistical significance precludes definitively stating that there were cost decreases or increases in other categories.

Table 8: Treatment Effect for Each Cost Category, SLS Waiver

Costs	Treatment Effect	95% Confidence Interval	
All Medicaid	-$125	[-$1,221	$970]
Waiver Services	$454	[$63	834]
Primary Care	$1	[-$22	$23]
Pharmacy	-$411	[-$943	$120]
Outpatient	-$109	[-$710	$490]
Inpatient	$36	[-$117	$189]
Emergency Department	$3	[-$11	$18]
Emergency Medical Services	$11	[-$15	$39]
Skilled Home Health	-$54	[-$589	$480]
Nursing Facility*	N/A		N/A

**No individuals in either group had nursing facility costs.*

Limitations and Next Steps for the Evaluation

Although the Medicaid claims analysis suggests the additional costs associated with CIHS are partially offset by reductions in other health care costs, the lack of statistical significance for nearly all the estimated effects means we cannot conclusively determine whether costs declined relative to other groups or that total Medicaid costs went up, even by the costs associated with CIHS.

A challenge with the current analysis is the relatively small sample of individuals in the intervention group. The treatment effect would need to be quite large to establish statistical significance. As more SCI and SLS waiver participants access CIHS over time, we can study larger samples and improve the reliability of estimated effects.

We also experienced challenges in creating reliable comparison groups. First, we found that about 20% of SCI waiver participants lacked SCI diagnoses or outcomes on their intake forms. In addition, the onset date of injury was almost always missing. We attempted to use SCI diagnoses on inpatient claims as an onset indicator, but this proved unreliable. Instead, we found that matching on the presence of inpatient claims in the pre-intervention quarters improved the comparability of pre-intervention trends between the intervention and comparison groups. However, this requirement led to a few intervention participants not being matched and limited the pool of potential matched participants in the comparison groups. Subsequent analyses could explore other health indicators and historical utilization indicators to both better match and potentially expand the pool of individuals in the comparison groups.

C. Are CIHS Associated with Better Quality of Life Scores?

Individuals who used CIHS with an SCI waiver tended to report higher quality of life scores than those who did not. Of SCI waiver participants who used massage, chiropractic, and/or acupuncture services at the time of the survey, 78% reported that they had a high, somewhat high, or moderate quality of life score, compared to just 60% of non-users (Figure 5). Pain is the likely driver of this relationship between CIHS usage and improved quality of life. For SCI participants, 67% of CIHS users reported that they had low to moderate pain, compared to 43% of non-users (Figure 6).

Figure 5: Quality of Life for SCI Waiver Participants, by CIHS Use

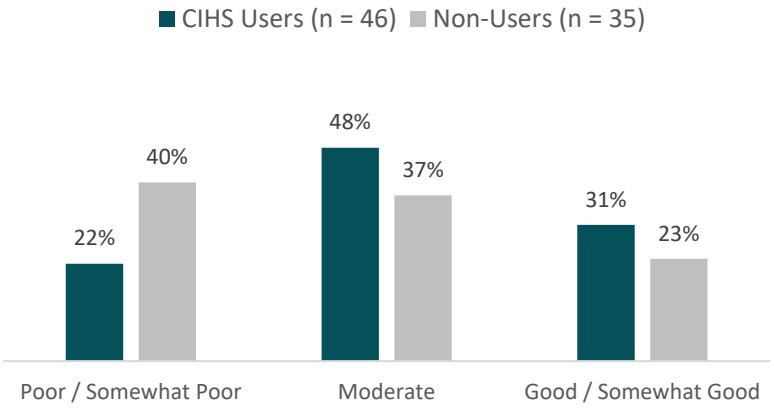
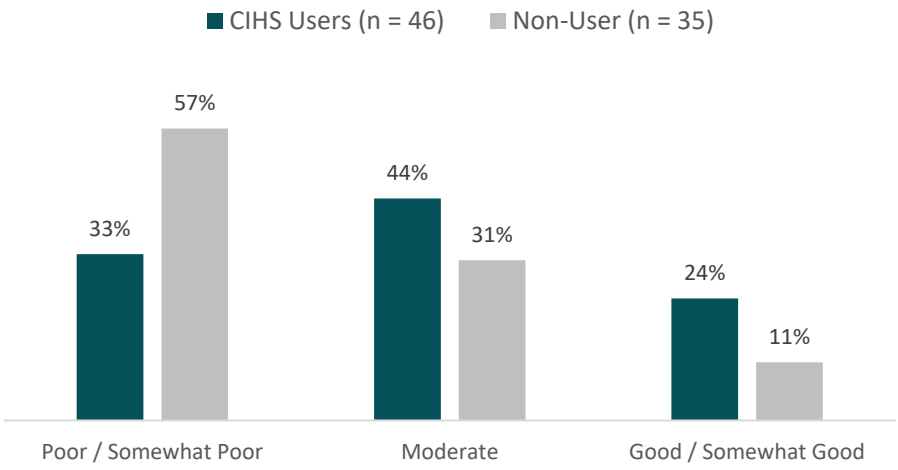


Figure 6: Pain for SCI Waiver Participants, by CIHS Use



When controlling for type of injury, date of onset, and social supports, there was a statistically significant relationship between CIHS usage and pain for SCI participants (p = .028), but not for quality of life overall.

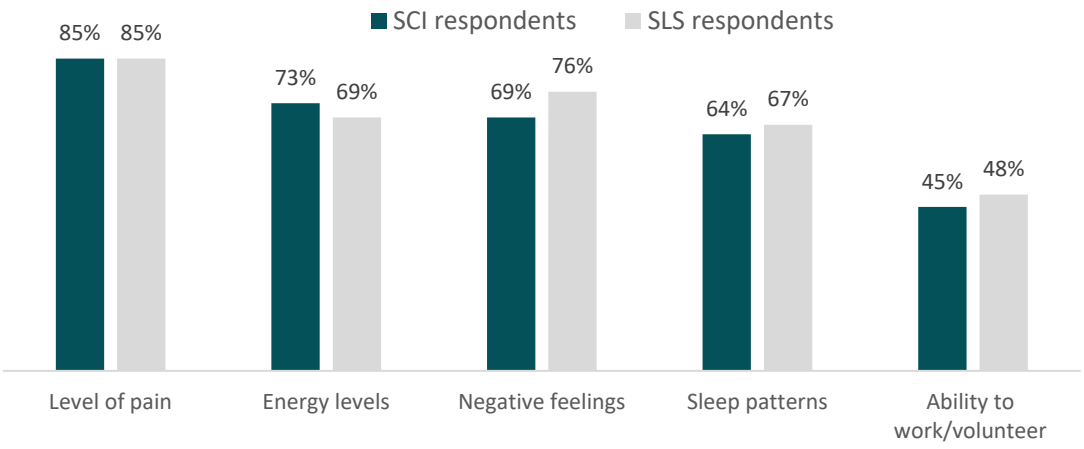
For SLS waiver participants, quality of life scores were similar for CIHS users and non-users. The regression analysis that controls for service use indicates that there is no statistical difference in quality of life scores between CIHS users and non-users.

D. How Do Participants Perceive the Benefits of CIHS?

Survey respondents and interviewees reported that CIHS' greatest benefit is reducing pain, with 85% of both SCI and SLS survey respondents reporting significant or moderate improvement in this regard (Figure 7). SCI waiver participants often complained of the tension created by being in a wheelchair. One interviewee indicated that because he lacks any "capability in the lower body," the upper body experiences stress and tension. A caregiver of an SLS user who suffered from a broken foot that never healed correctly indicated that her daughter ended up in a wheelchair in severe pain. CIHS plays a crucial role in alleviating their tension and discomfort:

> *"I definitely get the pain of an office job, but [the service] definitely cut back Tylenol or oxycodone that I would take when I would come home from work. It just alleviates a lot of pain throughout the week." – SCI waiver participant*
>
> *"It definitely lessens the pain… so I can endure more time in the chair." – SCI waiver participant*
>
> *"My daughter [has] a traumatic brain injury and is confined to a… wheelchair. Massage is to keep muscles loose in the shoulders and neck." – Caregiver of SLS waiver participant*

Figure 7: Percentage of Survey Respondents Who Reported that CIHS Significantly or Moderately Improved Aspects of Wellbeing



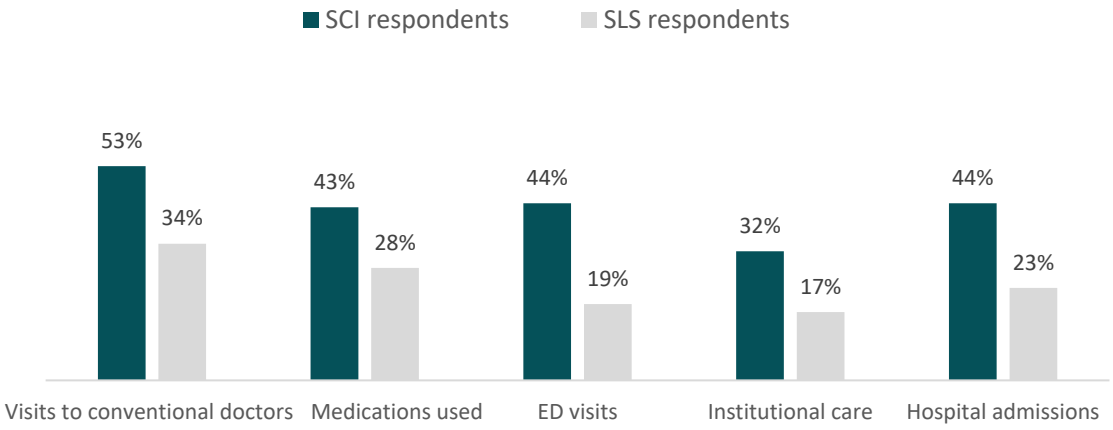
A reduction in pain and muscle tension can lead to increased mobility. A caregiver of an SLS waiver participant noticed a "significant improvement" in her daughter's "range of motion since starting massage," and another SLS participant reported being able to "walk longer distances" due to massage. An SCI waiver participant indicated that the reduction in pain has allowed her to participate more actively in physical therapy, which in turn improved her overall strength and mobility.

Surveys and interviews also pointed to improved mental health and better sleep resulting from CIHS. An SCI waiver participant reported that his anxiety had greatly decreased with massage, given that the service helps reduce the physical tension that builds up due to his paraplegia. The caregiver of an SLS waiver participant reported that the reduction in pain meant her daughter was no longer in a "super high anxious state." Another SLS caregiver indicated that after her daughter had two back surgeries and a hip replacement, the massage therapist available through the SLS waiver was able to "get her into a state where she was a lot more relaxed and could fall asleep."

> *I can skip one or two pills when I go see the therapist, the day that I go to the service. – SCI CIHS user*

CIHS reportedly had less impact on health care utilization. Fewer than half of SCI respondents and fewer than a third of SLS respondents reported a significant or moderate reduction in doctors' visits, medications used, emergency department visits, and hospital admissions as a result of CIHS (Figure 8). However, several SCI interviewees indicated that massage helped circulation and pain, which in turn reduced the need for medication and doctors' appointments to treat sores. One SCI waiver participant reported that CIHS actually increased her medication use because with the services, she feels more "hopeful" about her life situation and willing to engage in self-care. CIHS had the least reported impact on institutional care and hospital admissions, with many reporting that they did not require these services, regardless of CIHS.

Figure 8: Percentage of Survey Respondents Who Reported that CIHS Significantly or Moderately Reduced Health Care Utilization



Over 90% of respondents were satisfied or very satisfied with services in terms of quality, safety, and comfort at service sites.

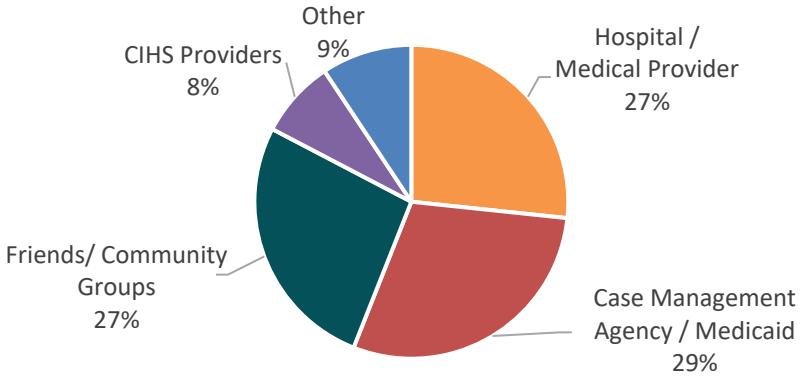
E. Do Participants Face Challenges in Accessing CIHS?

While survey respondents and interviewees reported relatively few challenges when enrolling in the waiver, some faced access issues, primarily related to transportation, the COVID-19 pandemic, and provider availability.

Enrollment in the SCI Waiver

The first step to accessing CIHS for many individuals is enrolling in the SCI waiver. Survey respondents and interviewees learned about the waiver through a range of sources, including the hospital where they were treated for their injury and their case management agency upon enrollment in Medicaid. Community groups and CIHS providers that serve people with spinal cord injuries and disabilities also played important roles in informing them of the waiver.

Figure 9: How Survey Respondents Learned of the SCI Waiver (Percentage of Total Responses)



Most respondents (77%) stated that enrolling in the SCI waiver was straightforward or that there were a few bumps, but the process was fine overall. Some who did experience challenges may have diagnoses less closely aligned with an SCI. For example, one caregiver of an SCI waiver participant indicated that their long enrollment delay was likely triggered by the participant's complex diagnosis; although he suffered from extreme pain and other neurological issues, he could still walk. Others indicated they were not provided accurate information about the enrollment process from their case managers. One interviewee experienced a three-month delay because his case worker did not properly assist him during the enrollment process due to the case worker's lack of knowledge. Another participant took years to enroll in Medicaid because he applied based on his income alone without realizing that the eligibility requirements were different for people with disabilities. Finally, some individuals delayed enrollment for personal reasons. One interviewee waited many years to enroll in the waiver because he was "not in the right mental place for it" after he became quadriplegic. With encouragement from a therapist, he eventually felt ready to reengage with society and access the waiver and then CIHS to improve his physical and mental health.

Service Access

Half of respondents that have used CIHS reported that they rarely miss appointments. However, health and transportation issues and appointment availability were reported as barriers to CIHS access.

Health issues: Many SCI and SLS waiver participants have complex medical conditions. As a result, about a third of CIHS users who responded to the survey reported that they were not always able to make appointments due to those issues. In addition, multiple respondents reported that the COVID-19 pandemic was a barrier. As one SLS survey respondent indicated, "massage therapy was the single most helpful support I had before

COVID. I have not accessed this service since COVID began, but fully intend to use it again once vaccinated."

Transportation: Transportation is a key component of CIHS access, given that about half of SCI respondents and 93% of SLS respondents do not drive themselves as their primary form of transportation. In addition, because CIHS providers are only located in the Denver Metro area, some individuals have to travel long distances to receive services. Interviewees reported difficulty in coordinating their appointments with paratransit services and that Medicaid transport deprioritizes elective services like CIHS. This causes CIHS consumers to either be late for their appointments or wait long periods of time after their appointments to be transported back home.

> *"I only used services a few times. The location of available treatment options was far enough away to make it hard to use consistently." – SLS waiver participant*

> *"Transportation is difficult. It must be done through case management, and I can't use the Medicaid transportation service. I have to take public transportation and pay out of pocket. I don't want to pay out of pocket for transport, so please make sure that it is available." – SCI waiver participant*

Appointment availability: Furthermore, relocation or loss of provider was reported as a common reason for not accessing services. Some interviewees attributed this challenge to the overall lack of Medicaid providers available because providers are typically paid more if they work privately. In addition, some consumers reported having stopped using services because of the lack of available appointments that worked with their schedules.

> *"They make more privately, so it's often hard to find or motivate people to work with this population, which is an underserved demographic." – SLS waiver participant*

Services allowed under the waiver: A high percentage of respondents reported being satisfied or very satisfied with the amount of services available through the waiver (80%–87%, depending on the service and the waiver). However, a handful of respondents indicated that they would benefit from more services. One survey respondent mentioned that CIHS "takes away SLS funds needed for day programming," and given that both are equally important, "one should not cancel out the other."

Lack of knowledge about services and service providers: Finally, a few interviewees and survey respondents indicated that they were interested in accessing services, but they were not sure how to go about finding a provider. One survey respondent indicated that he has so much to discuss with his case manager that he forgets to bring it up during their regular calls. Others indicated that their case managers are not familiar with the process because of frequent staff turnover.

3. Conclusions and Recommendations

Waiver participants reported that CIHS improve their pain and other aspects of their health and wellbeing. Quality of life scores obtained from survey responses substantiate these findings. CIHS users are more likely to have higher quality of life scores than non-users and, when controlling for participant characteristics, the relationship between CIHS and less pain is statistically significant. While we did not find a statistically significant impact of CIHS on health care costs, the observed patterns of costs over time between the intervention and comparison groups appear to show that the costs of CIHS are partially offset by reductions in other health care expenditures.

Given that these findings point to positive benefits of CIHS without incurring significant additional costs to the state, HCPF may consider efforts to expand access. While most consumers reported experiencing a straightforward SCI waiver enrollment process, the challenges some consumers experienced indicate the need to mitigate issues that can sometimes delay service access. Recommendations include:

- HCPF may consider expanding the reach of the SCI waiver beyond the Denver Metro area to grant individuals with spinal cord injuries in the rest of the state access to CIHS.
- SCI waiver members interviewed for this evaluation reported that Craig Hospital, where they were treated after their injury, was a key source of information on waiver services. Interviewees welcomed more outreach to other service providers to inform them about this waiver and its services so they can communicate benefits to patients.
- Case workers who are familiar with the waivers and service providers are crucial in helping consumers navigate the enrollment process, preventing mistakes that can delay the start of services. They can also inform participants of available service providers and strategies for accessing services. As case management agencies hire new case managers, these features should be key aspects of their training.
- Interviewees reported that there are not enough providers to serve this population, likely due to lower Medicaid reimbursement than in private settings. Efforts to attract more providers through outreach and higher rates can increase provider availability and thus access for consumers.

APPENDIX A: SURVEY FOR SCI WAIVER PARTICIPANTS

Thank you for taking this survey on your experience with Complementary and Integrative Health Services (CIHS), offered through the Spinal Cord Injury (SCI) waiver. The Department of Health Care Policy and Financing (HCPF), the agency that operates the state Medicaid program, would like to better understand how these services might impact your health and wellbeing and your suggestions to improve services and the functioning of the waiver. Your data will be processed and analyzed using the highest security standards. The evaluation team will only share data in the aggregate. Quotes may be included in public reports but will not be attributed to individuals.

Background

1. Onset of injury: MM/YYYY
2. Level of SCI:
    - C1-C4
    - C5-C7
    - T1-T5
    - T6-T12
    - L1-L5
    - S1-S5
3. Type or result of injury:
    - Quadriplegia
    - Paraplegia
    - Other:_____
4. Income source (check all that apply)
    - Full time employment
    - Part time employment
    - Social Security Income (SSI)
    - Social Security Disability Income (SSDI)
    - Other:_____
5. Live with (check all that apply):
    - Alone
    - Spouse/Partner
    - Parents/Siblings/Adult Children
    - Friends/Roommates
    - Other:_____
6. How would you describe your support network (types could include emotional, financial, or logistical support)?
    - Very strong
    - Strong
    - Moderate
    - Minimal
7. Primary source of transportation:

- Drive
- Taxi
- Bus
- Others drive
- Other:_____

Quality of Life (EQ-5D-5L)

The below questions will help HCPF understand if CIHS affects qualify of life over time. They make up an internationally validated survey called the EQ-5D-5L. You can watch a 2-minute video on the survey to learn more about how it was developed and is used today: https://euroqol.org/. To maintain validity (i.e., the degree to which the survey measures what it claims to measure), questions cannot be dropped or changed. We understand that the final question on mobility might not seem applicable to individuals in wheelchairs. Please check the box that you consider is the best option for you, i.e., the option which most accurately represents your opinion about your current situation with respect to mobility.

1. Pain
   - I have no pain or discomfort
   - I have slight pain or discomfort
   - I have moderate pain or discomfort
   - I have severe pain or discomfort
   - I have extreme pain or discomfort
2. Anxiety
   - I am not anxious or depressed
   - I am slightly anxious or depressed
   - I am moderately anxious or depressed
   - I am severely anxious or depressed
   - I have extremely anxious or depressed
3. Self-Care
   - I have no problems washing or dressing myself
   - I have slight problems washing or dressing myself
   - I have moderate problems washing or dressing myself
   - I have severe problems washing or dressing myself
   - I am unable to wash or dress myself
4. Usual Activities
   - I have no problems with performing my usual activities
   - I have slight problems with performing my usual activities
   - I have moderate problems with performing my usual activities
   - I have severe problems with performing my usual activities
   - I am unable to perform my usual activities
5. Mobility: Individuals in wheelchairs can check the box that you consider is the best option for you. In other words, check the option that most accurately represents your

opinion about your current situation with respect to mobility, replacing “walking about” to “getting around,” if applicable.

- I have no problems walking about
- I have slight problems walking about
- I have moderate problems walking about
- I have severe problems walking about
- I am unable to walk about

Perception of Impact of CIHS

HCPF would also like to know how you think that CIHS has affected your pain levels, ability to take care of yourself both emotionally and physically and use of health care services.

1. How would you describe your use of CIHS? Please check in the appropriate box for each service.

	Massage	Acupuncture	Chiropractic Services
Active user	○	○	○
Moderate user	○	○	○
Previously used services, but stopped	○	○	○
Have not used services but plan to	○	○	○
Have not used services and don't plan to	○	○	○

2. If you have not ever used massage, acupuncture or chiropractic services, why not? If you have stopped using any of these services, why?
3. If you have ever used massage, acupuncture or chiropractic services, to what extent do you feel that they impact (impacted) the following aspects of your health and wellbeing?

	Significant improvement	Moderate improvement	Minimal improvement	No change	Worsened
Level of pain	○	○	○	○	○
Negative feelings, such as blue mood, despair, anxiety, depression, or lack of motivation	○	○	○	○	○
Ability to work or volunteer	○	○	○	○	○
Energy levels	○	○	○	○	○
Sleep patterns	○	○	○	○	○

4. If you have ever used massage, acupuncture or chiropractic services, to what extent do you feel that they impact (impacted) the following?

	5 (decreased a lot)	4	3 (no change)	2	1 (increased a lot)
The number of visits to conventional doctors (e.g., primary care physicians)	○	○	○	○	○
The number or dosage of prescription medications used	○	○	○	○	○
Hospital admissions	○	○	○	○	○
Visits to the emergency department (ED)	○	○	○	○	○
Time spent in institutional care (e.g., rehab facility, skilled nursing facility)	○	○	○	○	○

Satisfaction with CIHS

1. If you have ever used massage services, please rate your satisfaction with these services.

	5 (very satisfied)	4	3	2	1 (not satisfied)
Appointment availability	○	○	○	○	○
Quality of the service	○	○	○	○	○
Safety and comfort at service site (e.g., being transferred)	○	○	○	○	○
Level of services allowable under the SCI waiver	○	○	○	○	○

2. If you have ever used acupuncture services, please rate your satisfaction with these services.

	5 (very satisfied)	4	3	2	1 (not satisfied)
Appointment availability	○	○	○	○	○
Quality of the service	○	○	○	○	○
Safety and comfort at service site (e.g., being transferred)	○	○	○	○	○
Level of services allowable under the SCI waiver	○	○	○	○	○

3. If you have ever used chiropractic services, please rate your satisfaction with these services.

	5 (very satisfied)	4	3	2	1 (not satisfied)
Appointment availability	○	○	○	○	○
Quality of the service	○	○	○	○	○
Safety and comfort at service site (e.g., being transferred)	○	○	○	○	○
Level of services allowable under the SCI waiver	○	○	○	○	○

Satisfaction with SCI Waiver

HCPF would like to understand what barriers you might face in accessing services and suggestions for improvement.

1. How did you hear about the SCI waiver?
    - Hospital
    - Another medical provider
    - Case management agency
    - Friends / community group
    - Internet / social media
    - Other: _____
2. How would you describe the ease of joining the SCI waiver?
    - Straightforward
    - A few bumps, but overall fine
    - Challenging
    - Extremely challenging
    - Other (please add description below):
3. What are your top reasons for missing (or not scheduling) CIHS appointments? (check up to three reasons)
    - I rarely miss appointments
    - Transportation
    - Appointment availability
    - Work/volunteer schedule
    - Health issues
    - Service benefits are not worth the effort
    - Other: _____
4. General Comments on Satisfaction and Suggestions for Improvement
5. Would you be willing to participate in a 30-45 minute interview to discuss your experience with CIHS?
    - Yes
    - No

APPENDIX B: CIHS INTERVIEW PROTOCOL

Thank you for agreeing to speak with me today. The Department of Health Care Policy and Financing (HCPF), the agency that operates the state Medicaid program, would like to better understand how CIHS – massage, chiropractor services, and acupuncture – might impact your health and wellbeing and your suggestions for improving services and the functioning of the waiver. Therefore, HCPF contracted with Mission Analytics Group, Inc. to conduct an evaluation of the program. The evaluation includes an analysis of Medicaid claims data, a survey, and interviews with a sample of participants.

We would like to audio-record the interview for note-taking purposes. The audio recording will not be shared with anyone outside of the evaluation team. Do you agree to be audio-recorded? We will summarize data across the interviews to share in a public report. If we use a quote from your interview, we will not attribute it to you.

Do you have any questions before we get started?
[If yes to recording] I've started the recording. We'll begin the interview questions now.

Use of CIHS

- According to my records, you were injured in [year]. When did you join the SCI waiver in [year]? [If applicable, probe on why there were any delays between the injury and joining the SCI waiver and/or joining the waiver and starting services; the waiver began in 2012.]
- When did you start using CIHS services? [If applicable, probe on why there were any delays between joining the SCI waiver and starting services.]
- What types of CIHS services do you receive and how often?
- Does this seem like the appropriate amount of services to treat your condition? Why or why not?

Thank you for that information. The next set of questions is about your perceptions of the impact of the CIHS service you receive.

Perceptions of Impact of CIHS

- Has CIHS affected your wellbeing?
- If so, how so? [Probe on pain, sleep, mood, mobility, self-care, participation in work/volunteering, participation in enjoyable activities, social interactions]
- If not, why not? [Probe on don't believe services are effective, can't access the services with enough frequency, injury is too severe, didn't get services early enough]
- Has CIHS impacted your use of other health care services? If so, how so? [Probe on prescriptions, frequency of other doctors' visits, emergency department visits, hospital admissions]

The last questions are for us to get general feedback on the quality and administration of CIHS services. Your honest feedback will help us identify any barriers to accessing services.

Suggestions for Improvement

- Are there any barriers to accessing CIHS? If so, what are they, and do you have any suggestions for reducing barriers to access?
- Do you have any suggestions for improving the quality or effectiveness of CIHS?
- What are your thoughts about the SCI waiver enrollment process?

Conclusion

Thank you for your time today. Is there anything else you'd like to add that you feel is important for us to know?