MINDSOURCE – Brain Injury Network and Colorado Brain Injury Trust Fund Board
Report to the Joint Budget Committee and Health and Human Services Committees
July 1, 2021 – June 30, 2022

This report is provided in response to the requirement set forth in Section 26-1-310, C.R.S., for the Colorado Brain Injury Trust Fund Board to "provide a report to the Joint Budget Committee and the Public Health Care and Human Services Committee of the House of Representatives and the Health and Human Services Committee of the Senate, or any successor committees, on the operations of the trust fund, the money expended, the number of individuals with brain injuries offered services, the research grants awarded and the progress on such grants, and the educational information provided pursuant to this article 1."

Overview

MINDSOURCE – Brain Injury Network (MINDSOURCE), formerly the Colorado Brain Injury Program, was created in Title 26, Article 1, Part 3 of the Colorado Revised Statutes to be operated by the Colorado Department of Human Services (CDHS). The purpose of MINDSOURCE is to improve the lives of Colorado residents who have survived brain injuries. This statute created the Colorado Brain Injury Trust Fund (Trust Fund) to finance MINDSOURCE activities and the Trust Fund Board (Board) to advise the program on Trust Fund operations. Three Board members are designated in statute and 10 members are appointed by the Governor with the consent of the Senate. The following is a list of the Trust Fund Board members for FY 2021-22. The Board has established three ongoing committees to assist staff in policy-setting of program goals and strategic planning for the Trust Fund: Program Evaluation and Research, Client Services, and Vision and Outreach.

Colorado Brain Injury Trust Fund Board Members Fiscal Year 2021-22	
Name	**Employment/Affiliation**
Jennifer Coker	Craig Hospital
James Graham	Colorado State University
Russha Knauer	Division of Probation Services
Renee Charlifue-Smith	University of Colorado, JFK Partners
Jason Kacmarski	Rocky Mountain Regional VA Medical Center
Angie Wickersham	Hilltop Life Adjustment Program
Jamal Long Soldier	Denver Indian Center
Daniel Lindberg	University of Colorado, School of Medicine
Latoya Mize*	Denver District Attorney's Office
Angie Goodger	Colorado Department of Public Health and Environment
Victoria Ortega	City and County of Denver
Gretchen Russo	Colorado Department of Human Services
Kenneth Scott	Denver Public Health
*Ms. Mize resigned from her position mid-year, which remained vacant until the start of the new Fiscal Year.	

Program Administration

MINDSOURCE is housed within the Office of Adult, Aging and Disability Services at CDHS. MINDSOURCE staff work closely with the Board to perform the following functions for the program: financial management, policy development, program development and implementation, contract management, program monitoring, administrative support, website maintenance, public assistance and information, reporting, marketing, and public relations.

Revenue and Expenditures

MINDSOURCE receives revenue in the Trust Fund from surcharges assessed for convictions of driving under the influence of drugs or alcohol (DUI), driving while ability is impaired (DWAI), speeding, and riding a motorcycle or motorized bicycle without a helmet (for youth under the age of 18).

In 2019, House Bill 19-1147 updated the surcharge structure for the Trust Fund and added an appropriation of $450,000 General Fund to the Trust Fund line item. The $450,000 General Fund was fully expended in FY 2019-20. However, the General Fund was not appropriated as part of the Long Bill for FY 2020-21 due to the economic challenges and revenue shortfall resulting from the onset of the COVID-19 pandemic. These funds were once again appropriated for the program in Fiscal Year 2021-22 and beyond and were fully expended in FY 2021-22.

In FY 2021-22, the total revenue for MINDSOURCE was $2,392,532, $1,942,532 of which was added to the Trust Fund and $450,000 General Fund appropriated. The program expended $2,020,502 in FY 2021-22. The following table shows the breakdown of Expenditures by Program Type.

MINDSOURCE Cash Fund & General Fund Expenditures by Program Type Fiscal Year 2021-22				
Brain Injury Services	**Research Grants**	**Community Grants**	**Administrative Costs & In-Directs**	**Total**
$1,476,167	$222,430	$20,522	$301,383	$2,020,502

Services

Every five years MINDSOURCE issues a competitive request for proposals for an entity to provide outreach, intake and eligibility, case management services (including resource navigation and self-management), and education consultation (for youth 0-21). MINDSOURCE currently has a contract for the five year period of FY 2021-22 through FY 2025-26 with the Brain Injury Alliance of Colorado (BIAC) for these services. In addition, MINDSOURCE has an interagency agreement with the Colorado Department of Education (CDE) to build the capacity of school and community providers to better support and serve children/youth with brain injury. Please see the addendum for detailed information on the services and educational information provided through BIAC and CDE in FY 2021-22.

Research

MINDSOURCE awards grants to support research in Colorado related to the treatment and understanding of brain injuries. During FY 2021-22 MINDSOURCE had five active research grant projects. All five grantees requested to extend their projects into this fiscal year due to challenges associated with the COVID-19 pandemic. Please see the addendum for detailed information on the research grants awarded and the progress on such grants in FY 2021-22.

In addition, the Research Program released a request for proposals (RFP) during FY 2021-22 for new projects to begin on 7/1/22. CDHS ensures an equitable procurement process by soliciting for competitive bids, posting on a public website, and securing diverse evaluators without conflicts of interest. Equity, diversity, and inclusion principles are built into the RFP as well as the resulting contracts with the program. Five applications were received with two being awarded funds after a formal evaluation process. Research is funded at two levels: Type I (up to $50,000/year for two years) and Type II (up to $150,000/year for two years). More details about these projects will be shared in next year's report.

Community Grants

MINDSOURCE awards grants to community agencies for projects that promote the awareness and education of brain injury. During Fiscal Year 2021-22, a new grant solicitation was delayed until mid-year as the program and Board evaluated revenue and expenditures to ensure funds were available for a new cycle of grants. Four new grants were awarded to the following community agencies for 18-month projects, beginning on January 1st, 2022:

- Center Toward Self Reliance
- Lit-Up My Mind
- Brain Injury Hope Foundation
- Brain Injury Alliance of Colorado

Addendum

Services

Brain Injury Alliance of Colorado (BIAC)

During FY 2021-22, 815 adults and 46 youth received support from BIAC services as described below:

- *Resource Navigation* is intended to be quick and responsive support provided via phone, email, or in person. Examples of resource navigation include, but are not limited to: finding medical providers, completing paperwork, securing benefits, understanding brain injury, and connecting to community resources.
- *Self-management/Skill-building* is a program designed and available for survivors of brain injury who want to invest time in improving their skills in specific areas that can be challenging after a brain injury. Participants meet with their Brain Injury Advisor for an average of 4 hours per month to work on skill-building. Areas of focus for self-management include Home Skills, Personal Skills, and Vocational Skills. Participants have regular homework outside of meetings with their Advisor that is reviewed each time the participants and Advisors meet. BIAC Advisors work one-on-one with each participant to assess individual strengths and weaknesses, identify natural supports in the participant's life, and develop strategies for building specific skills with the goal of greater self-sufficiency.
- *Youth Education Consultation.* After a brain injury, children and youth may have challenges in the classroom and families may need support navigating the education system. BIAC has a Youth Education Liaison specialist on staff to provide consultation and support services to children and youth, ages 0-21. Consultation and support may include, but are not limited to, the following: providing parent/guardian education about services and programming options available in schools, assisting in the partnership between parents and schools, educating parents and school teams about how a student has been impacted by the individual's brain injury, collaborating with schools on intervention planning, attending transition, individual education planning, multi-tier support systems, other planning meetings, partnering with hospitals to help with transition to school, and any other student specific educational needs/concerns/questions.
- *Classes & Workshops.* BIAC offered 113 classes and workshops with the combined total attendance of 1,010. Classes and workshops ranged in topics. FY 2021-22 topics included: adaptive yoga, art therapy, comedy writing, SAIL (Self Advocacy for an Independent Life), grief and loss, mindful brain practices, music therapy, parenting workshop, poetry, cooking, team building and social skills for youth, social wellness, tai chi/breathwork, client empowerment, and a IEP/504 workshop for parents. Classes and workshops were either held remotely due to COVID-19 surges or in a hybrid environment of remote and in person activities to reduce barriers for clients to participate and increase reach to more clients across the state.
- *Outreach.* MINDSOURCE contracts with BIAC to provide training and outreach. During FY 21-22, BIAC coordinated 115 outreach and training activities with approximately 1,814 attendees. The following is the breakdown of location for those outreach efforts:
    - 61% Denver Metro
    - 4% Central Mountain Region
    - 10% Southern CO
    - 10% Northern CO
    - 5% Western Slope
    - 10% Statewide

  Outreach typically consists of meeting with community providers to share information about services and to encourage referrals to brain injury supports and services. Training and capacity building efforts support the development and strengthening of skills, processes, and resources for

organizations and communities to serve survivors. BIAC collects pre and post data about the educational training provided to better understand effectiveness. During this reporting period:

- 99% of participants reported that their understanding of what a brain injury is increased
- 94% of participants strongly agreed or agreed that their understanding of how to support people with brain injuries increased.
- 94% of participants strongly agreed or agreed that their knowledge of resources available to survivors of a brain injury increased.

Colorado Department of Education (CDE)

As indicated above, MINDSOURCE has an interagency agreement with CDE. The focus of the CDE interagency agreement is to build the capacity of school district personnel and community providers to better support and serve children/youth with brain injury. CDE's activities that support this mission include:

- Training of BrainSTEPS (Strategies Teaching Educators, Parents, & Students) Colorado teams to support children/youth with moderate to severe acquired brain injury, as well as individuals with protracted recovery from concussion (mTBI). During this fiscal year CDE hosted a three-day BrainSTEPS CO New Team/New Team Member virtual training preparing two additional BrainSTEPS CO Brain Injury Consulting Teams and 62 new team members to add to existing teams to keep the teams adequately staffed. There are now 29 Districts and 5 Board of Cooperative Educational Services (BOCES) Level BrainSTEPS CO Teams with 210 team members serving 66 districts in Colorado (covering approximately 75-80% of the Colorado student population).
- Advancing the skills of existing BrainSTEPS CO team members through a one-day Update Training.
- Furthering the skills of BrainSTEPS CO team leaders through a Team Leader Training (each BrainSTEPS CO team has either one or two team leaders).
- Training Return to Learn Concussion Management Teams (CMTs) in schools throughout the state via the BrainSTEPS CO online Return to Return to Learn CMT training course. Two-hundred and eighteen schools in Colorado have registered Return to Learn CMTs members, and 406 school personnel have completed the Return to Learn CMT training. This year the CMT training course was the focus of district level nurses who strongly encouraged their UAP staff to take this course as a means to to help with the implementation of concussion supports within schools.
- Hosting monthly Return to Learn CMT Community of Practice (CoP) online webinars/ meetings featuring guest speakers who are nationally known experts in concussion, to keep the knowledge of individuals who have completed the CMT training up-to-date.
- Providing bi-monthly Concussion Action Team webinars/meetings to keep district personnel up-to-date on return to learn concussion information.
- Holding monthly teleconference calls with BrainSTEPS CO Team Leaders to disseminate information and answer questions regarding brain injury, consultation, training, etc.
- Supporting BrainSTEPS CO team members through consultation and mentoring.
- Providing consultation to school personnel and parents with questions regarding brain injury.
- Managing the Traumatic Brain Injury (TBI) and Concussion Action Team listservs, disseminating information on a regular basis.
- Disseminating brain injury information at state conferences and professional meetings.
- Managing the Colorado Kids with Brain Injury (www.cokidswithbraininjury.com) and CDE brain injury (http://www.cde.state.co.us/healthandwellness/braininjury) websites.

Additionally, MINDSOURCE partners with CDHS Offices, Divisions and Programs as well as other state agencies by providing training on identification of brain injury and guidance for supporting individuals with brain injury in their respective systems to help them achieve greater outcomes.

Research

Below are summaries provided to MINDSOURCE by the grantees from FY 2021-22 that include a synopsis of the grantees purpose and progress. Each of these projects were initiated after a competitive RFP process. CDHS ensures equity by soliciting for competitive bids, posting on a public website, and securing diverse evaluators without conflicts of interest. Equity, diversity, and inclusion principles are built into the RFP as well as the resulting contracts with the program.

Title: *"Hypocretin Replacement as a Countermeasure for Sleep-Wake Disturbances in a Mouse Model of Traumatic Brain Injury"*
Principal Investigator: Mark Opp
Institution: University of Colorado, Boulder
Progress: Prior to the COVID-19 research shutdown, we subjected 64 mice to TBI as detailed in our proposal. Some mice were in the control group and others received the experimental treatment. Before the COVID-19 research shutdown, we had sliced and stained much of the brain tissue. However, the time-intensive task of cell counting for this project completely stopped as we could not have undergraduate students on campus / in the laboratory. Work resumed and we have now completed capturing the fluorescent images from all brain tissue (n=64 brains) and are in the process of conducting the morphological assessment of microglia cell activation (changes in microglia morphology are a marker of neuroinflammation). During the next six-month reporting period we will finish this morphological assessment and analyze the results. At that time, we will be done with all aspects of this project that we can complete and will focus on writing a manuscript that will include results of this project.

Title: *"Initiation of an Early Exercise Program to Improve Symptoms and Psychosocial Function after Pediatric Mild Traumatic Brain Injury"*
Principal Investigator: David Howell
Institution: Children's Hospital Colorado
Progress: We enrolled adolescents with a recent concussion into a randomized study comparing an individualized exercise program to the typical care provided by doctors (a somewhat vague recommendation to perform physical activity). We asked participants to rate the severity of their concussion symptoms at the initial visit, and then asked them again when they returned one month later. In addition, they performed a stationary bike exercise test so that we could understand the intensity of exercise that was sufficient to advise participants randomized to the exercise group to adhere to (a level below that which exacerbates symptoms). Our primary outcome was whether participants continued to report symptoms for more than one month after injury or not (a common clinical milestone, as treatment plans often change at this time if symptoms are unresolved). We found that the group who was randomized to the exercise program had a lower proportion of individuals who experienced persistent symptoms than those who were randomized to the standard treatment group. While this result was not statistically significant, the results indicate a beneficial effect related to early intervention following concussion through an individualized exercise treatment plan. Based upon the preliminary findings that we obtained through this grant, we were able to successfully obtain a National Institutes of Health (NIH)-funded R01 award. This $3.3 million, 5-year project will build upon what we have done in this MINDSOURCE funded project and is a multisite study between Children's Hospital Colorado and Boston Children's Hospital. We anticipate this new project will be the largest treatment study of adolescents with concussion to date.

Title: *"Machine Learning and Cytotoxic Edema in Abusive Head Trauma"*
Principal Investigator: Daniel Lindberg

Institution: University of Colorado
Progress: The core objective of this project is to improve care of children with traumatic brain injury and concern for abuse by using machine learning to recognize new patterns of brain injury that are associated with abuse and with poor outcomes. The team has developed cutting-edge MRI-based imaging methods and are well-suited to identify new patterns of brain injury that can be used to improve diagnosis and predictions for clinical care. We completed initial derivation and testing of a machine-learning algorithm to identify MRI scans with cytotoxic edema (CE) with good accuracy (80-92%) and high areas under the curve (97-99%). As expected, CE correlated with a worsened outcome. Next steps will be to further characterize locations and patterns of cytotoxic edema to further delineate patterns associated with abuse or poor outcome.

Title: *"Intimate Partner Abuse and Traumatic Brain Injury"*
Principal Investigator: Anne DePrince, PhD
Institution: University of Denver
Progress: Though intimate partner violence (IPV) often involves physical blows, research has been slow to focus on brain injuries among victims and survivors, including to explore associations between mild injuries and health service need and use. To address this gap, this project enrolled 102 women seeking services connected to a family justice center who were aged 18 or older, spoke English or Spanish, and had been victimized by an intimate partner. Preliminary analyses compared rates of injuries detected during an initial study session using a brief screen versus an interviewer-administered questionnaire. The brief screen identified 85% of participants as having lifetimes histories of a hit to the head, seeking medical care for an injury to the head, or alterations in consciousness due to an injury to the head. The interviewer-administered questionnaire identified 89% of participants as having any lifetime head injury and 80% as having a head injury with alteration in consciousness. The interviewer-administered questionnaire provided additional details about the nature of those injuries. Of the women who reported at least one head injury, 60% indicated that the head injury had been perpetrated by an intimate partner. About half of participants reported histories of repeated head injuries (e.g., due to child abuse, intimate partner violence, sports). On the brief screen, women reported an average of 4.22 (SD = 3.83) difficulties, such as headaches, memory problems, and difficulty concentrating. Further, 69% of women described having been strangled by their intimate partner, which can cause brain injuries by disrupting the flow of oxygen to the brain. Women also reported significant health problems, including multiple physical symptoms in the past year; limitations during moderate activities (e.g., cleaning, exercise) were common. Three months later, nearly 20% of women who participated in a follow-up session reported experiencing a hit to the head, having sought medical care for an injury to the head, or alteration in consciousness due to an injury to head since the first session.

Title: *"Microbiome, Inflammation, and Gut Permeability: The Onset of Psychiatric Conditions Among Those with Acute mTBI"*
Principal Investigator: Lisa Brenner
Institution: University of Colorado
Aim 1: In the year post-acute mild traumatic brain injury (mTBI), compare baseline and change values of skin, oral, and gut microbiome composition and diversity among those that go on to develop a new or recurrent psychiatric condition versus those who do not.
Progress: 15 new participants were recruited and enrolled 7/1/2021-12/31/2022. Data collection was ongoing for those newly enrolled, as well as the other participants previously enrolled.
Aim 2: Compare the baseline and 12-month systemic inflammatory and gut permeability metrics of those that go on to develop a new/recurrent psychiatric condition compared to those who do not. Develop predictive models utilizing microbiome, inflammatory, gut permeability, and meta data to improve identification of those who will develop a new/recurrent psychiatric condition post-mTBI.

Progress: Data collection has been completed for the majority of participants. The study team is continuing data collection for those who have not reached the final timepoint. Data scoring has begun, and specimen processing is in process. Initial analysis meetings have begun.