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Impacts and Lessons from the Brain Builders Lab

Practical Advice on How to Spread and Embed Brain
Story Science in Communities

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Alberta Family Wellness Initiative



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Developed in collaboration with the **Alberta Family Wellness Initiative**



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Introduction and Overview

In 2018, the Canadian Centre on Substance Use and Addiction (CCSA) partnered with the Palix Foundation's [Alberta Family Wellness Initiative](#) (AFWI) to launch the [Brain Builders Lab](#) (BBL). The aim of the BBL was to move Brain Story science – a body of knowledge linking childhood trauma to later health outcomes – into action. Between 2019 and 2021, participants in the BBL – the Brain Builders – undertook projects in their communities to align policies and practices with this science. The present document aims to showcase the impressive breadth and depth of the Brain Builders' achievements, and to inspire action among those who have learned the science but are unsure about next steps. It is intended for change makers at all organizational levels working in any sector as long as they are ready to shift how they approach upstream prevention to better meet the needs of those living with mental health and substance use disorders.

Adverse Childhood Experiences and Their Relationship to Mental Health and Substance Use

Adverse childhood experiences (ACEs) are defined as stressful events experienced before age 18 that increase the risk for negative health outcomes across the lifespan. The most studied types of ACEs include child mistreatment, neglect and household dysfunction. Research shows that ACEs are common in the population (Hughes et al., 2017; Felitti et al., 1998), with 57–64% of individuals reporting at least one ACE in their lifetime, and one in eight (~13%) reporting four or more. Studies show that the more ACEs someone has experienced, the more likely they are to report behaviours such as smoking (Anda et al., 1999), heavy drinking (Dube et al., 2002) and illegal drug use (Dube et al., 2003). Exposure to ACEs is also linked to greater likelihood of depression (Hughes et al., 2016) and other mood disorders (Lu et al., 2008), need for mental health treatment (Hughes et al., 2018), and attempted suicide (Bellis et al., 2014). Broad, population-based interventions to prevent ACEs have significant potential to address both mental health and substance use costs and harms, especially among populations where inter-generational cycles of trauma are impacting community wellness.

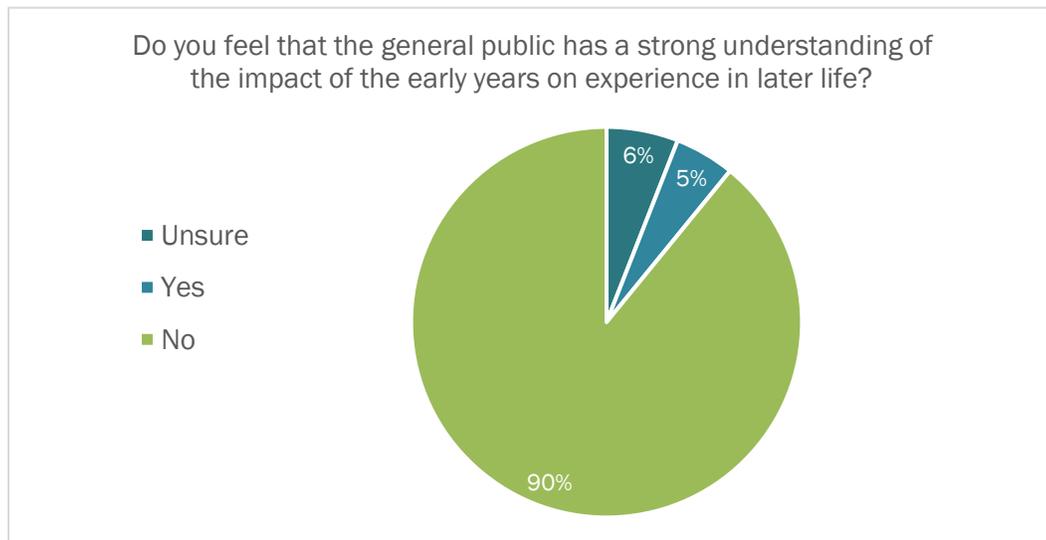
The Brain Story

Decades of research from the neurosciences and genetics show that ACEs exert their long-term effects by interfering with brain development. During the first 25 years of life, experiences and environments shape our developing brain circuits (National Scientific Council on the Developing Child, 2007) and can alter gene expression (how our genes are “read”) (National Scientific Council on the Developing Child, 2010). This ultimately influences development of the skills and abilities required for learning, establishing relationships, coping with challenges, and maintaining good mental and physical health (National Scientific Council on the Developing Child, 2015). ACEs produce their effects through prolonged activation of the brain's stress response system, called a toxic stress response. If toxic stress is unchecked and there are no supportive relationships or interventions, it can undermine brain development in ways that make poor health outcomes more likely over time (National Scientific Council on the Developing Child, 2014).

To develop appropriate avenues for substance use prevention and trauma-informed intervention, it is important to understand the science behind ACEs and how they influence brain development, and to apply this understanding to program and policy decisions. But the science is not widely understood (Figure 1), which limits workforce capacity to align policies, programs and practices with the science.



Figure 1. Results from an informal poll at the 2021 Brain Builders Lab meeting



[The Brain Story](#), as promoted by AFWI and described in the following links, is an evidence-based approach to communicating key scientific concepts about brain development, ACEs and resilience to the general public. It uses concrete metaphors to explain how and why brain and early child development matter to adult outcomes. It organizes them into a story that describes what promotes healthy brain development, what derails it, why this is important and what we can do about it. The metaphors used to support the Brain Story are as follows:

- [Brain architecture](#) refers to the idea that brains are not just born, they are also built over time and require a strong foundation of basic skills to support the development of more complex skills, like a house needs a strong foundation to support the walls and roof.
- [Serve and return](#) interactions liken the responsive, back-and-forth social interactions between a child and a caregiver that build strong brain architecture to a game where a ball is passed back and forth.
- [Toxic stress](#) refers to the type of stress response that if unchecked can interfere with and damage developing brain architecture. ACEs inflict toxic stress.
- [Air traffic control](#) describes the important role executive functions and self-regulation play in helping us navigate through our complex world and cope with daily challenges.
- [The resilience scale](#) illustrates the dynamic nature of how positive and negative experiences interact with the biology we are born with to shape health outcomes across the lifespan.

The AFWI has created a number of resources to help communicate the Brain Story. These include:

- The [Brain Story Certification Course](#) (BSCC), a free, online course that explains the detailed science comprising the Brain Story;
- A [resource repository](#) that includes videos and other products to help communicate the Brain Story; and
- [Posters and cards](#) that illustrate key concepts in the Brain Story using explanatory metaphors that have been tested for public comprehension.



The Brain Story has been tested for public comprehension in Canada, the U.S., the U.K. and Australia. It has been shown to significantly improve public understanding of the importance of childhood experiences and upstream prevention in addressing complex social issues like substance use. Evaluations of jurisdictions and organizations that have applied the Brain Story show that it supports a common understanding and common language both within and across sectors that shifts mental models about why many individuals and families struggle to succeed (Alberta Family Wellness Initiative, 2020a). The common knowledge base and reframed understanding among stakeholders in turn provides opportunities for new, innovative and system-level approaches to address complex social issues that span the substance use prevention, intervention and treatment continuum and ultimately improve outcomes for all.

CCSA's Brain Builders Lab



In 2018, CCSA partnered with AFWI to launch the [Brain Builders Lab](#) (BBL), a community-based effort to move Brain Story science into action across the country. Broadly, the BBL involved selecting a cohort of champions who became known as the Brain Builders and supporting them in developing, implementing and evaluating projects to spread and embed Brain Story science in their communities. For CCSA, the goal was to increase awareness of substance use as a preventable public health issue, and to build capacity among communities to use the science to change policies, practices and public perceptions accordingly.

In its 2018–2021 cycle, CCSA selected 65 Brain Builders from across the country, primarily active in health care, education, and child and family services. CCSA convened this cohort at a March 2019 event in Ottawa, with completion of the BSCC and organizational buy-in as prerequisites for attendance. Over the course of the two-day event, the Brain Builders had access to experts, facilitators and a systematic process to develop two-year projects that would raise awareness of the science and advocate for its application in policy and practice (see the [meeting summary report](#)).

CCSA's support over the two years allotted to implement the projects consisted of:

- Providing opportunities for knowledge exchange (quarterly check-in calls, online platform);
- Enabling access to mentors and experts for knowledge mobilization, evaluation, sex- and gender-based analysis and cultural considerations; and
- Developing forms and tools to facilitate project planning, data collection and reporting.

Brain Builder Locations

- British Columbia
- Alberta
- Manitoba
- Ontario
- Quebec
- New Brunswick
- Nova Scotia
- Prince Edward Island
- Newfoundland and Labrador

In February 2021, the Brain Builders reconvened (virtually, because of the COVID-19 pandemic) to share and celebrate their accomplishments (see the [event program](#) for more information). Many of



their outcomes were captured in [impact videos](#) they created in the winter of 2020. This document serves to showcase the impressive breadth and depth of achievements reported by Brain Builders from their evaluation efforts and end-of-project exit interviews.

Brain Builders Lab Activities and Outcomes

The 2018–2021 BBL produced a total of 36 projects from 65 Brain Builders working alone or in pairs or teams. However, work on many of the projects was disrupted by the COVID-19 pandemic so that 25 projects were completed and reported data.

What the Brain Builders Did

Each project's activities were unique, given that project plans were tailored to the Brain Builders' sectors, spheres of influence and existing buy-in. Despite this heterogeneity, project activities tended to fall into four categories, with each project containing at least one activity from at least one category. The categories and examples of specific activities in each were as follows:

1. Building workforce capacity:
 - a) Presentations to staff;
 - b) Encouraging or mandating staff completion of the BSCC;
 - c) Embedding Brain Story concepts in post-secondary curricula.
2. Educating communities and professional networks:
 - a) Organizing learning events and presentations targeting external stakeholders;
 - b) One-on-one conversations and presence at roundtables;
 - c) Newsletters.
3. Updating programs and service delivery:
 - a) Adding Brain Story concepts to program materials;
 - b) Adding Brain Story concepts to existing training.
4. Raising public awareness:
 - a) Social media campaigns;
 - b) Website updates;
 - c) Informational booths and stands at events.

What the Brain Builders Measured

Project evaluation plans were equally heterogeneous, but outcomes reported by each project again fell into a small set of categories:

1. Reach:
 - a) How many people learned about the Brain Story?
 - b) How many and which sectors were reached?
2. Effectiveness:
 - a) Did people's knowledge, awareness and understanding of the science increase?
 - b) Did attitudes change and stigma decrease?



- c) Did people's perception of their own role change?
 - d) Did people want to learn more?
 - e) Did people express a desire to apply the science in practice?
3. Adoption and application of the knowledge:
- a) Did people change how they did things based on the science?
 - b) Did any materials or practices change?
 - c) Did any policies or programs change?
 - d) Did system coordination increase?

Evidence of Success

Across the 25 projects that completed their work despite the pandemic, Brain Builders reported a significant number of activities and outputs. Specifically, this cohort of Brain Builders:

- Created a total of **230 unique products** (presentations, brochures, social media campaigns, etc.);
- Delivered **435 unique activities** (staff training, workshops, learning events, etc.); and
- Reached a total of **34,550 stakeholders**, including:
 - Members of the healthcare, education, social service and public safety workforces;
 - Organizational leadership and policy makers;
 - People living with or in recovery from mental health and substance use disorders; and
 - Parents and the general public.

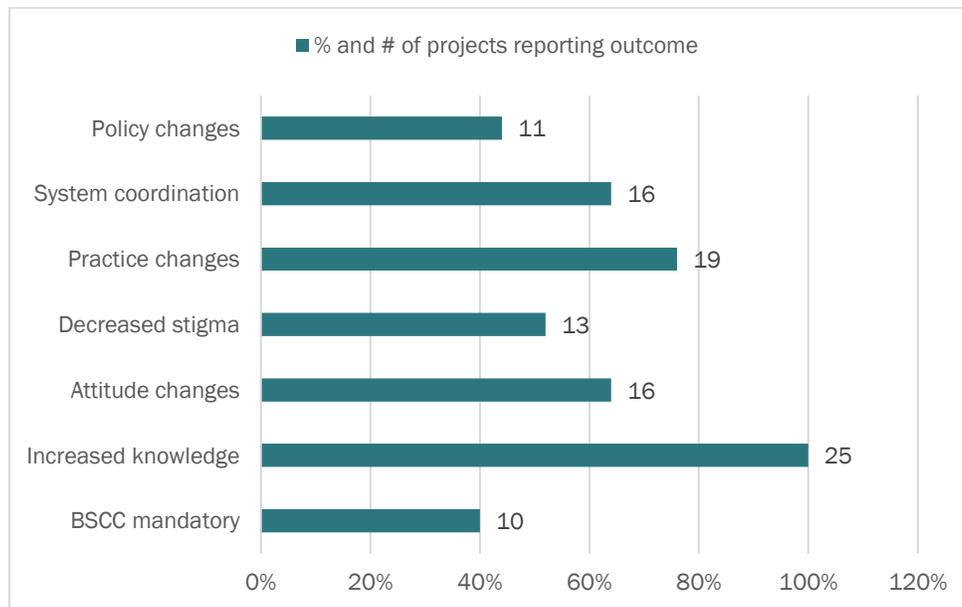
Further, outcome data reported by these projects indicated significant progress in spreading and embedding the Brain Story. Successful outcomes included individual practice change, program adaptations, organizational embedding, new partnerships, recruitment of new change agents, and the beginnings of distributed leadership around the application of brain science to practice.

Specifically, across the 25 projects:

- 100% reported **increased knowledge** and awareness among their stakeholders;
- 52% of those who measured attitude changes reported **decreased stigma**;
- 76% reported **practice changes**;
- 44% reported **policy changes**, including 40% who mandated or encouraged the BSCC as staff training; and
- 64% reported better **system coordination** and collaboration.



Brain Builders Lab Outcome Summary (n=25)



Lessons from the Brain Builders Lab

In addition to the quantitative data reporting described above, we also conducted qualitative, semi-structured interviews about the strategies Brain Builders used, the outcomes and impacts this had at the individual, program, organization and system levels, and project drivers and barriers. These data were synthesized into cases and then themed to provide guidelines and highlight some of the key ingredients for success.

The following formula for success emerges from the BBL lessons: common knowledge base + common understanding + community and relationships + evaluation + backbone support + distributed leadership = cross-sector change to support prevention, early intervention and recovery.

The 10 lessons described below emerged from the data. Each lesson is illustrated by two unique case studies. However, all cases contributed to the lessons learned from the BBL and provide good examples of more than one lesson. The case studies themselves can be found on the [BBL webpage](#).

The Brain Story Itself Does a Lot of Heavy Lifting

Fidelity to the Brain Story's empirically tested core story narrative and metaphors acted as a facilitator of change in and of itself. It made complex scientific concepts easier to grasp and provided a common understanding and language across professions, sectors and silos that could be used to establish common ground. Weaving Brain Story concepts together with specific content that was relevant to particular audiences often helped promote strong engagement and support for the work.

The cases in this section illustrate that what gets communicated is as important as how it is communicated.

- Consortium pour les élèves du nord de l'Ontario (CÉNO) (Northern Ontario)
- School District 91, Nechako Lakes (North-Central British Columbia)



The Knowledge Needs to Be “Baked in the Cake”

The knowledge to be delivered should be embedded into organizational culture, goals, policies and theories of change. Tying the Brain Story to existing organizational goals and plans helped accelerate large-scale buy-in and ensure sustainability. Projects should make it clear that understanding and applying the Brain Story is not an extra, but rather a tool to help reach existing goals. If such goals do not exist, the knowledge can be used to create new organizational goals that are evidence-based and align with the science. Furthermore, Brain Builders who were able to integrate project activities into their regular responsibilities viewed their projects as sustainable over the long-term.

The cases in this section illustrate how tying the knowledge to existing organizational goals and plans helped accelerate large-scale buy-in and ensure sustainability.

- Nova Scotia Early Childhood Development Intervention Services
- IWK Health (Nova Scotia)

Widespread Change Requires Boots on the Ground

The distributed leadership established by aligning the efforts of many champions with different spheres of influence around common goals can significantly accelerate the pace and scope of change and also serves to support innovative, cross-sector initiatives. In the case of the BBL, projects that prioritized constant cultivation of new change agents often achieved the most widespread change. Projects focused on large-scale organizational, community or system-level change should continuously work to expand core networks and invite new champions into the change process to broaden their reach and share the work.

The cases in this section illustrate how constant cultivation of new champions for the work helped achieve widespread change.

- Newfoundland and Labrador network
- YMCA of Three Rivers (Waterloo Region, Ontario)

Capitalize on Relationships

The ability to capitalize on existing or new relationships was a key driver in the success of many projects. As with brain development, relationships are critical for change efforts to succeed. Projects should look for key relationships within their own networks that can be leveraged to support goals and make efforts to cultivate weak or missing relationships. This includes leaning on others doing similar work, as Brain Builders who learned from each other’s successes and challenges tended to achieve their goals more readily. Brain Builders who were able to network with other Brain Builders in their region developed new partnerships, adapted each other’s ideas and kept each other motivated.

The cases in this section illustrate how existing and new relationships can help increase reach and impact.

- Simcoe Muskoka District Health Unit (Ontario)
- Horizon Health Network (New Brunswick)



Run with Early Adopters but Don't Forget to Work on Naysayers

While projects that focused on early childhood, education and family services were often able to get buy-in and move forward quickly, those focused on engaging other sectors, such as justice, law enforcement, corrections and specialized health care, took more time. Future projects should take into account the extra time, effort and persistence required to engage under-represented groups and those who are slow to embrace change and continue to pursue their engagement.

The cases in this section illustrate that while certain sectors come on board and move forward quickly, there are under-represented sectors that will take more time and effort.

- Developmental Trauma Action Alliance (Ontario)
- Alberta Health Services

Sense-Making Is an Active and Deliberate Process

Project success was often achieved by ensuring that adequate time and resources were dedicated to regular group discussions of Brain Story concepts and their relevance to the group's goals and activities. This process not only helps people internalize knowledge, but also provides opportunities to generate new science-aligned goals and ideas for application, and troubleshoot implementation problems as they arise.

The cases in this section illustrate projects that ensured that adequate time and resources were dedicated to reflection on the knowledge.

- Big Brothers Big Sisters of Ottawa (Ontario)
- Open Doors for Lanark Children and Youth (Ontario)

Use Both Bottom-Up and Top-Down Approaches

Project success often stemmed from engagement at all organizational or system levels. While direct service providers and other professionals are crucial in determining what applying the knowledge looks like on the ground, implementing these ideas can be significantly accelerated with the right leadership support. In addition, projects that allowed participants to co-create project activities were by and large more successful in obtaining buy-in and following through on activities. Projects should determine what co-creation means in their context and devise local strategies to identify and engage both direct services and leadership as champions for the work.

The cases in this section illustrate how engagement at all organizational levels supports change, and that co-creation of project activities is crucial.

- Bayview Glen Independent School (Toronto, Ontario)
- York Region Public Health (Ontario)



Connect Research with Both Practice and Public Policy to Support Large-Scale Change

Projects that actively engaged policy makers and focused on building Brain Story concepts into government policy were able to create a more receptive public policy environment for future Brain Story-aligned work. Public policy can help support change initiatives by standardizing practices and allocating public resources.

The cases in this section illustrate how the policy environment can help support project activities and create a receptive environment for additional activities in future.

- Thunder Bay Drug Strategy and Community Safety and Well-Being Thunder Bay (Ontario)
- Regional Municipality of Durham (Ontario)

Build a Culture of Continuous Evaluation

Project evaluation was a requirement of participation in the BBL. While unfamiliar and time-consuming for some, evaluation was ultimately recognized as an important tool for communicating impact. In fact, many projects implemented in Alberta before the BBL cited a lack of systematic evaluation as their number one regret (see the Alberta Family Wellness Initiative, 2020b). Future projects should continuously evaluate both processes and outcomes, using both quantitative and qualitative methods, to be able to communicate and show evidence for the impact of their work.

The cases in this section recognize the importance of evaluation in communicating impact.

- The Salvation Army's Bethany Hope Centre (Ottawa, Ontario)
- Valley Community Services Society (Creston, British Columbia)

Get Backbone Support

Backbone support from CCSA was universally cited as a key element that helped Brain Builders create and sustain change. Backbone organizations support their stakeholders by helping to align activities across projects and sectors, bridge gaps and create accountability. They also often provide functions such as strategy development, coordination, networking and relationship building, resource sharing, idea generation and troubleshooting. However, while backbone support was seen as critical, it should be noted that leadership from the Brain Builders themselves and other change agents ultimately determined project success. Several projects created committees or integrated the Brain Story into other initiatives or committees that can provide a level of backbone support going forward. Future projects should look for backbone support from organizations or initiatives if they do not have this capacity themselves.

Applies to all cases.

Additional Activities and Lessons

The cases in this section illustrate additional activities and lessons gleaned from projects that faced challenges and roadblocks.



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