



Mental Health  
Commission  
of Canada

Commission de  
la santé mentale  
du Canada



Canadian Centre  
on Substance Use  
and Addiction

Centre canadien sur  
les dépendances et  
l'usage de substances

# The Brain Story: Science and Practice

Knowledge Exchange Collaborative Webinar #5

Mental Health Commission of Canada & Canadian Centre on Substance Use and Addiction

December 05, 2018



# CCSA Brain Builders Lab

**CCSA has launched an opportunity to support professionals across sectors in moving Brain Story knowledge into practice.**

## The Brain Builders Lab

- 2-day event in Ottawa
- CCSA bringing together stakeholders to **develop projects that reflect Brain Story science**
- Brain Story certification required to attend
- More info:  
[www.ccsa.ca/Eng/topics/Children-and-Youth/Brain-Story](http://www.ccsa.ca/Eng/topics/Children-and-Youth/Brain-Story)

## Timeline

- Nov 30, 2018: Deadline to express interest in Brain Builders Lab
- Dec 2018: Selection of participants and registration
- March 3, 2019: Deadline to complete Brain Story certification
- **March 4-5: Brain Builders Lab**
- 2019 - 2021: Project implementation and Community of Practice
- 2021: Follow-up event to assess impact of projects

## Purpose

- Build capacity and cross-sectoral connections
- Advance practice in a way that is trauma-informed and grounded in science
- Develop common language and knowledge base to underpin advocacy and knowledge mobilization

# Today's Webinar

How childhood trauma affects brain development to influence mental health and addiction



Nicole Sherren  
Alberta Family  
Wellness Initiative



Cynthia Wild  
Big Brothers Big  
Sisters of Calgary  
and Area



# The Effect of Early Experiences on Brain Development, Mental Health, and Addiction

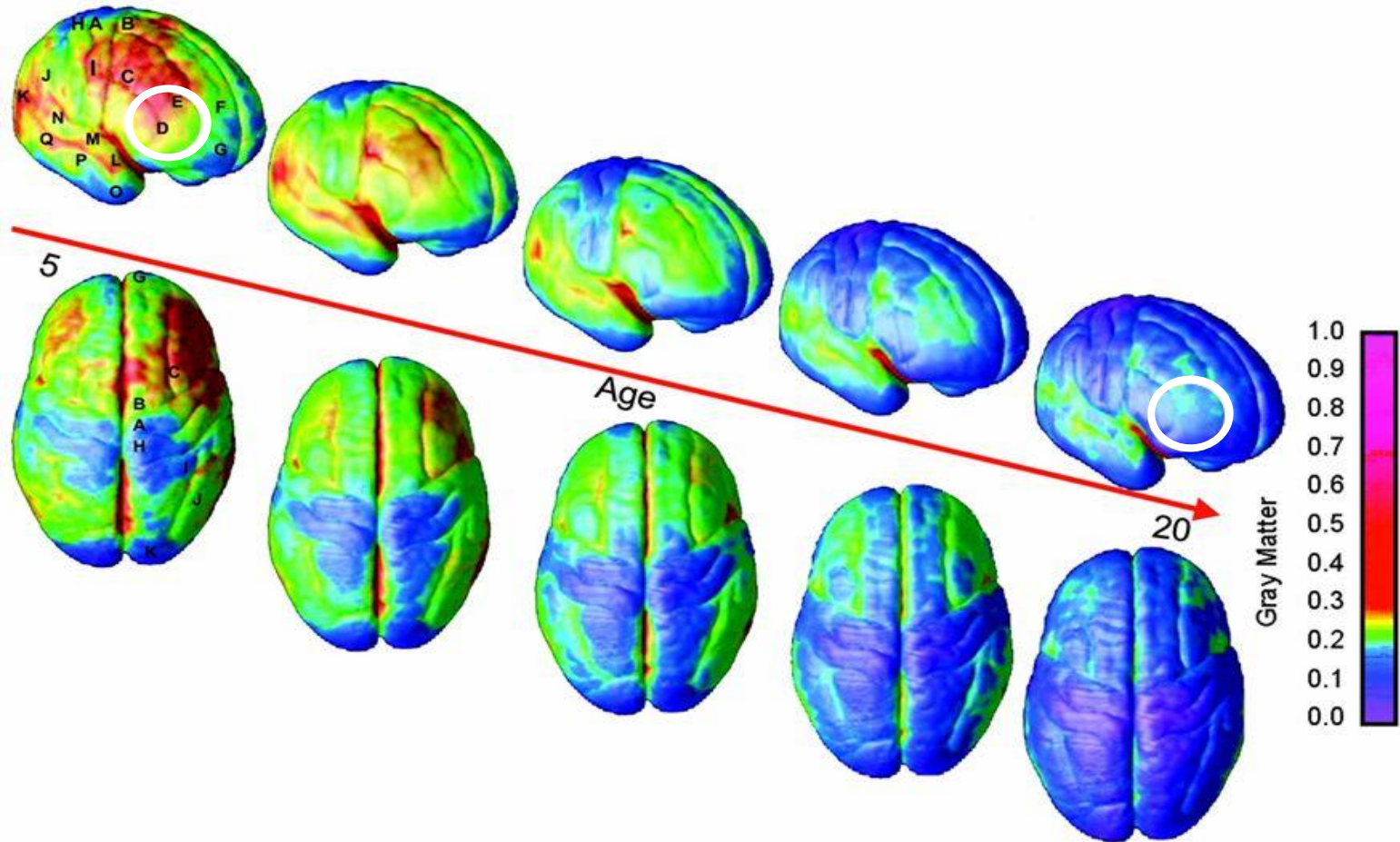
Nicole Sherren, PhD

KE Collaborative Webinar

December 5, 2018



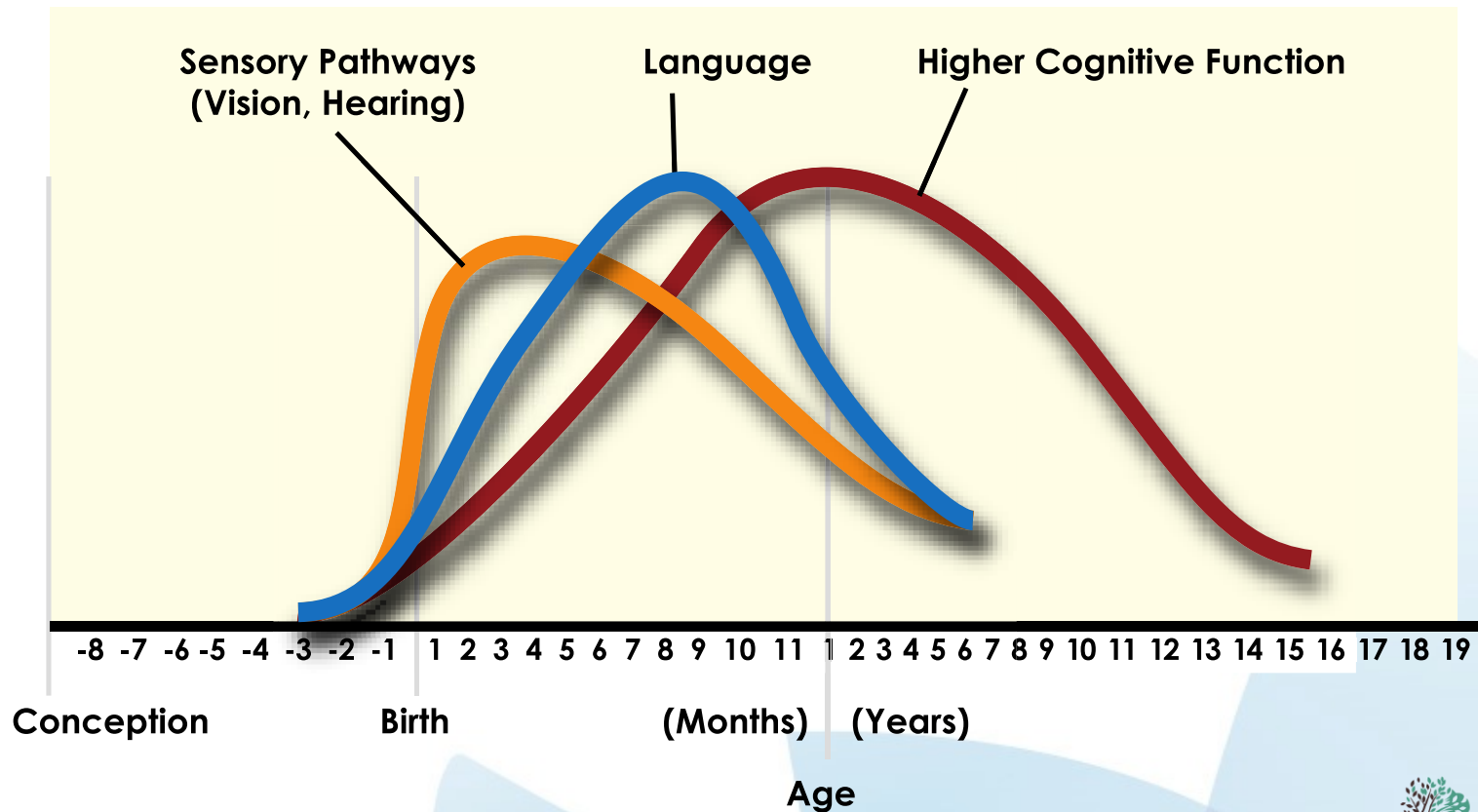
# Brain Development is a Long-term Process: Maturing Until ~ 25 Years



Source: Gotgay, Giedd, et al., 2004

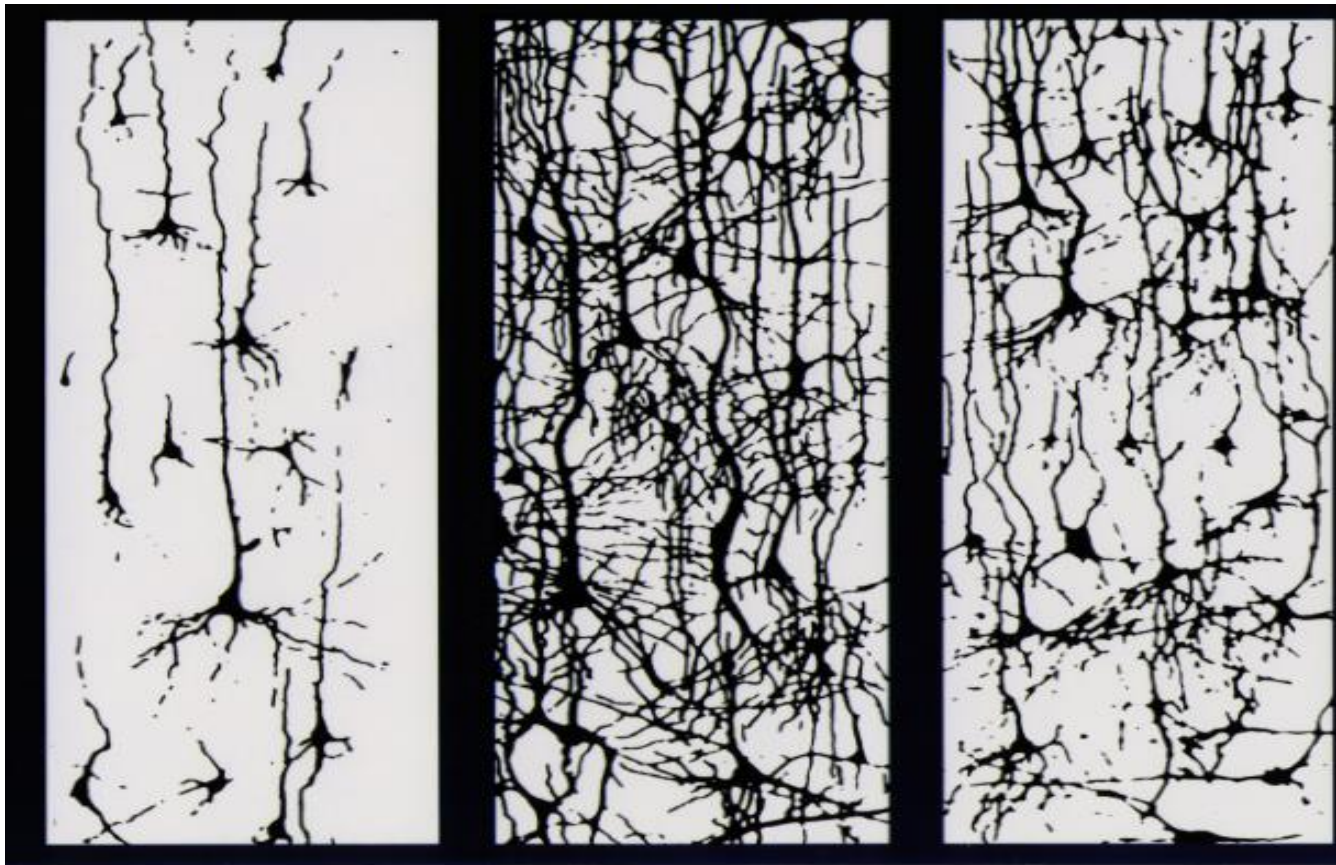
# Neural Circuits are Wired in a Bottom-Up Sequence

## Experience-Dependent Synapse Formation



Source: C.A. Nelson (2000)

# Experience-Based Pruning of Synapses During Childhood and Adolescence



Birth

3 years

14 years

# What Kind of Experiences Shape Brain Architecture?



# “Serve and Return” Social Interactions With Adults Build Cognitive, Social, and Emotional Skills in Children



# Executive Function is Like Air Traffic Control: Helps Children Navigate Their World and Succeed in Life

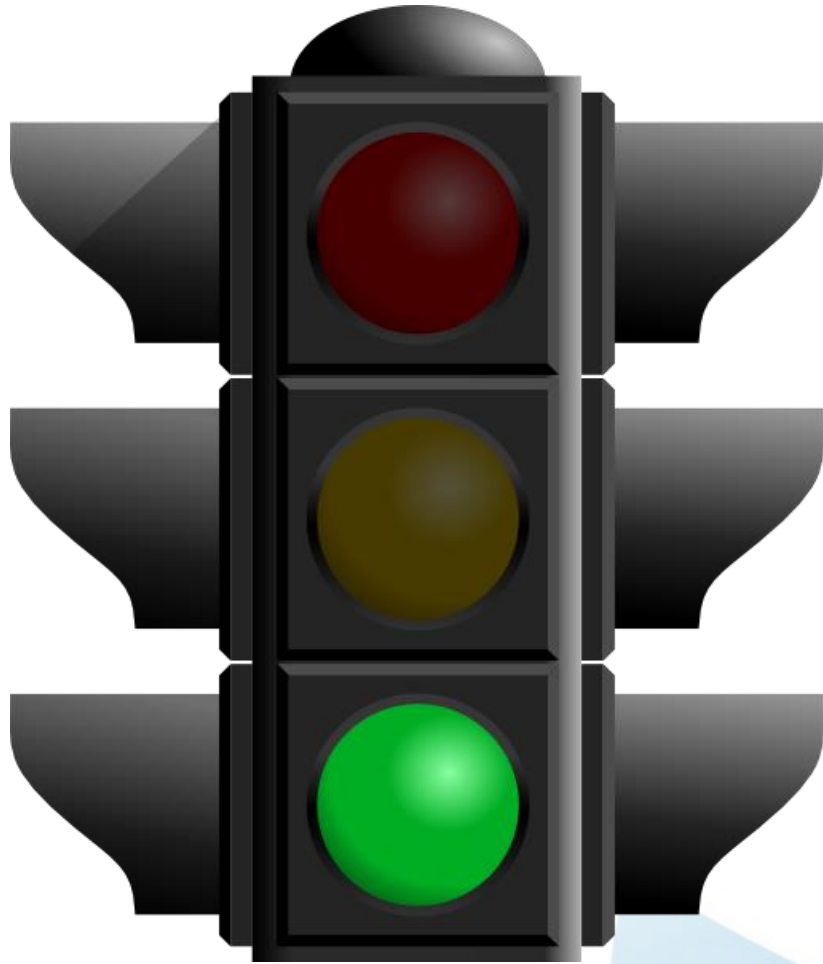


EF skill set is based on cognitive, social and emotional competencies:

- Attention
- Working memory
- Self-regulation
- Delayed gratification
- Planning and organization
- Perseverance
- Reasoning and evaluation
- Problem solving
- Cognitive flexibility

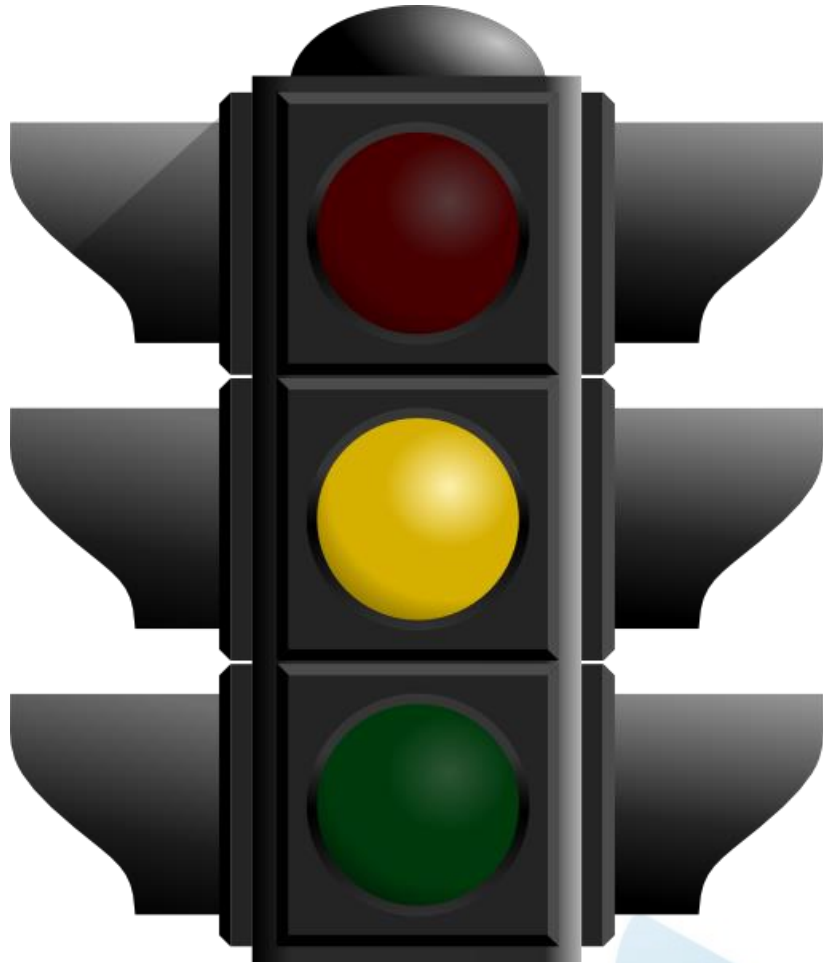
# The Biology of Early Adversity

# Stress Also Shapes Brain Architecture



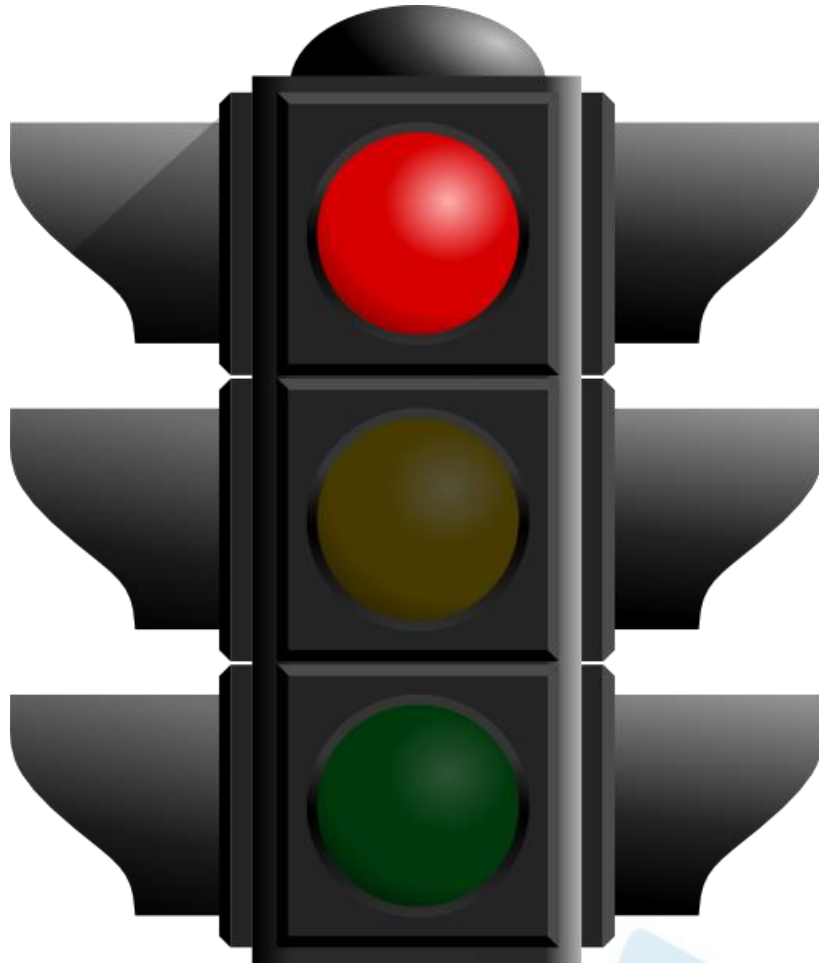
Positive Stress: Brief activation of stress response system, required for healthy development; e.g., immunization, first day of school.

# Stress Also Shapes Brain Architecture



Tolerable Stress: Serious but temporary activation of stress response, can damage brain architecture if not buffered by supportive adult relationships; e.g., death in the family.

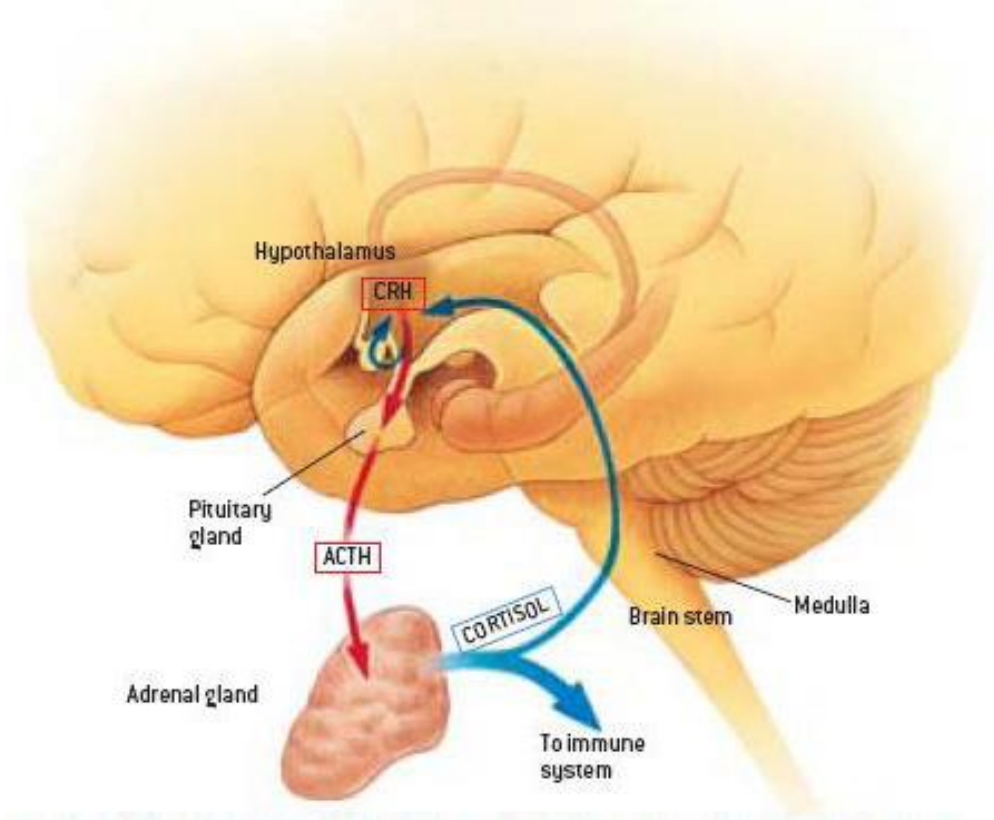
# Stress Also Shapes Brain Architecture



Toxic Stress: Prolonged activation of the stress response system in the absence of supportive adult relationships; e.g., abuse, neglect, living with an addicted or depressed parent.

# Early Toxic Stress is Biologically Embedded and Affects Behaviour and Health

## STRESS RESPONSE SYSTEM



### Effect of Catecholamines (Adrenalin):

- Increased heart rate, blood pressure
- Decrease in non-essential functions (e.g., digestion, reproduction)
- Blood clotting
- Mobilization of glucose stores

### Effect of Glucocorticoids (Cortisol):

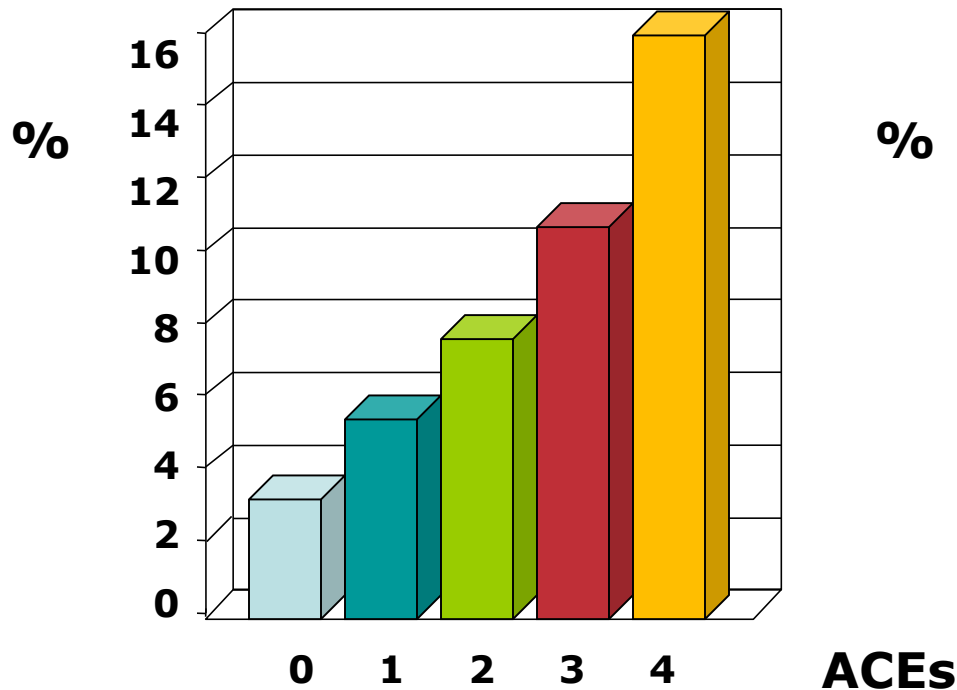
- Glucose metabolism
- Insulin production
- Immunosuppression and activation
- Negative feedback on HPA axis

# What's the Long-term Risk?



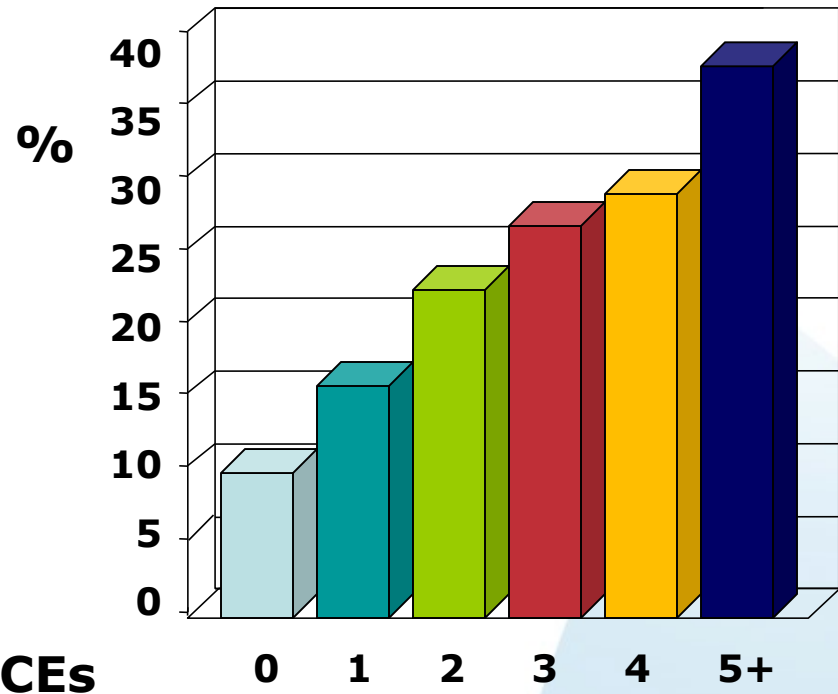
# Early Adversity Increases Risk for Substance Use Disorders in Adulthood

## Self-Report: Alcoholism



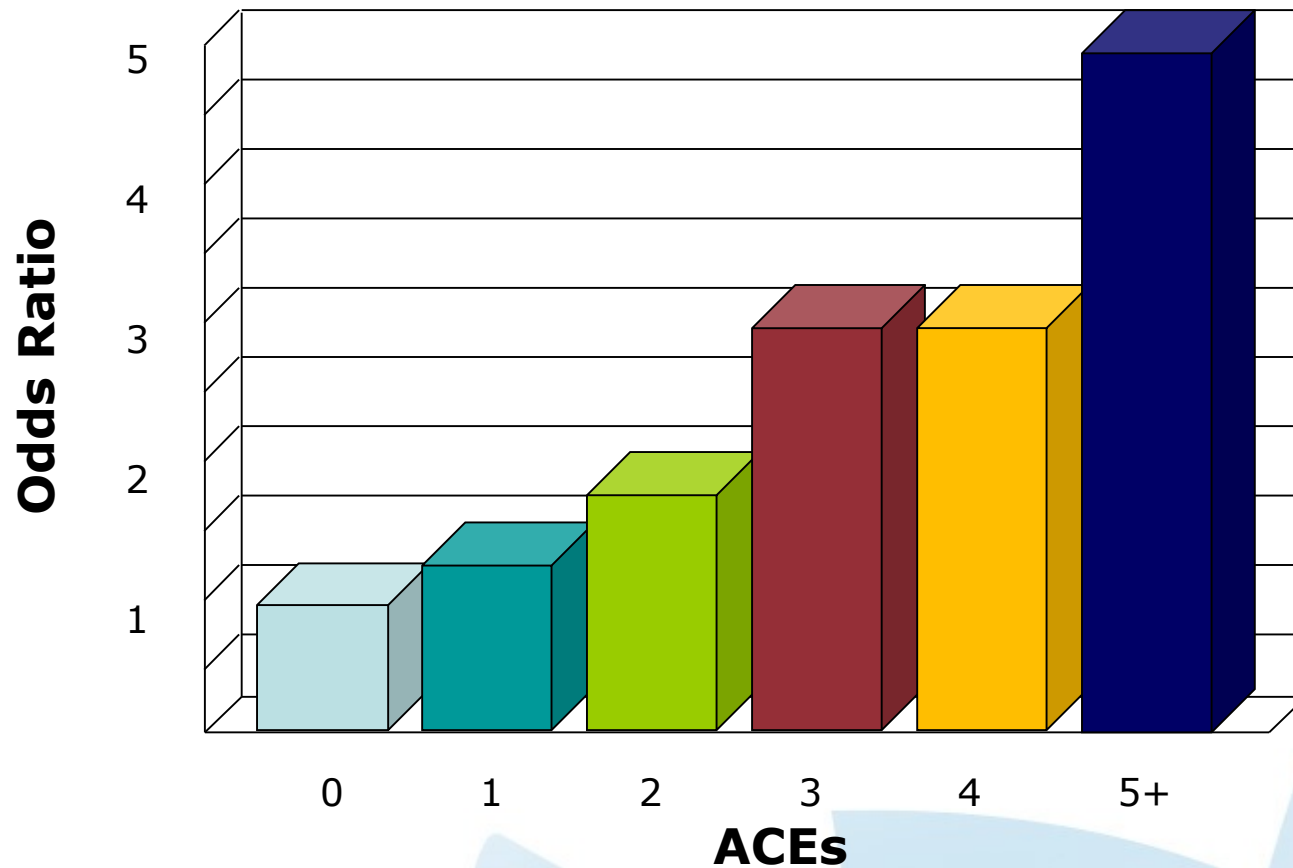
Source: Dube et al. (2002)

## Self-Report: Illicit Drugs



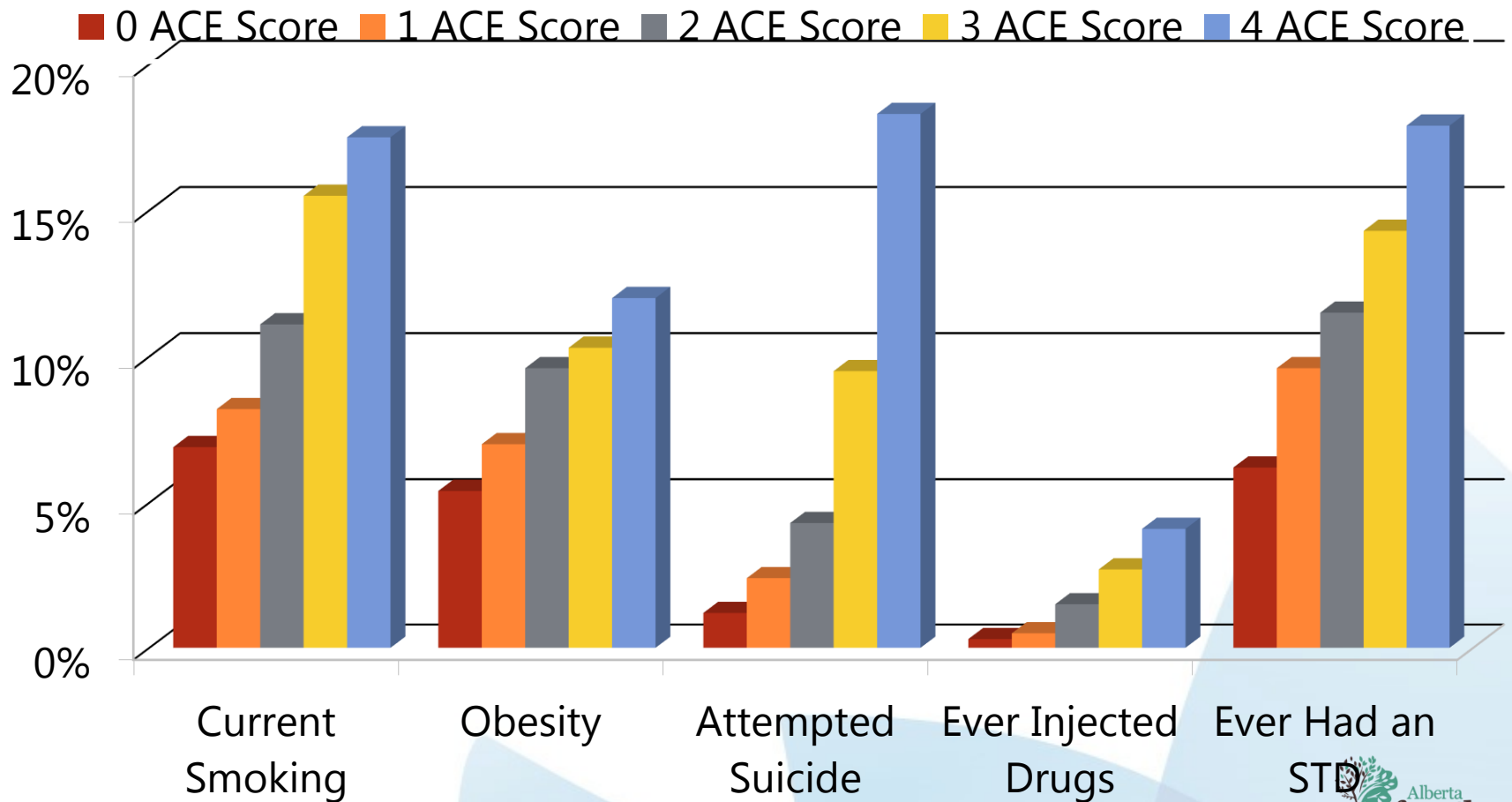
Source: Dube et al. (2003)

# Early Adversity Increases Risk for Depressive Disorders in Adulthood



Source: Chapman et al. (2004)

# Early Adversity Increases Risk for Other Public Health Problems

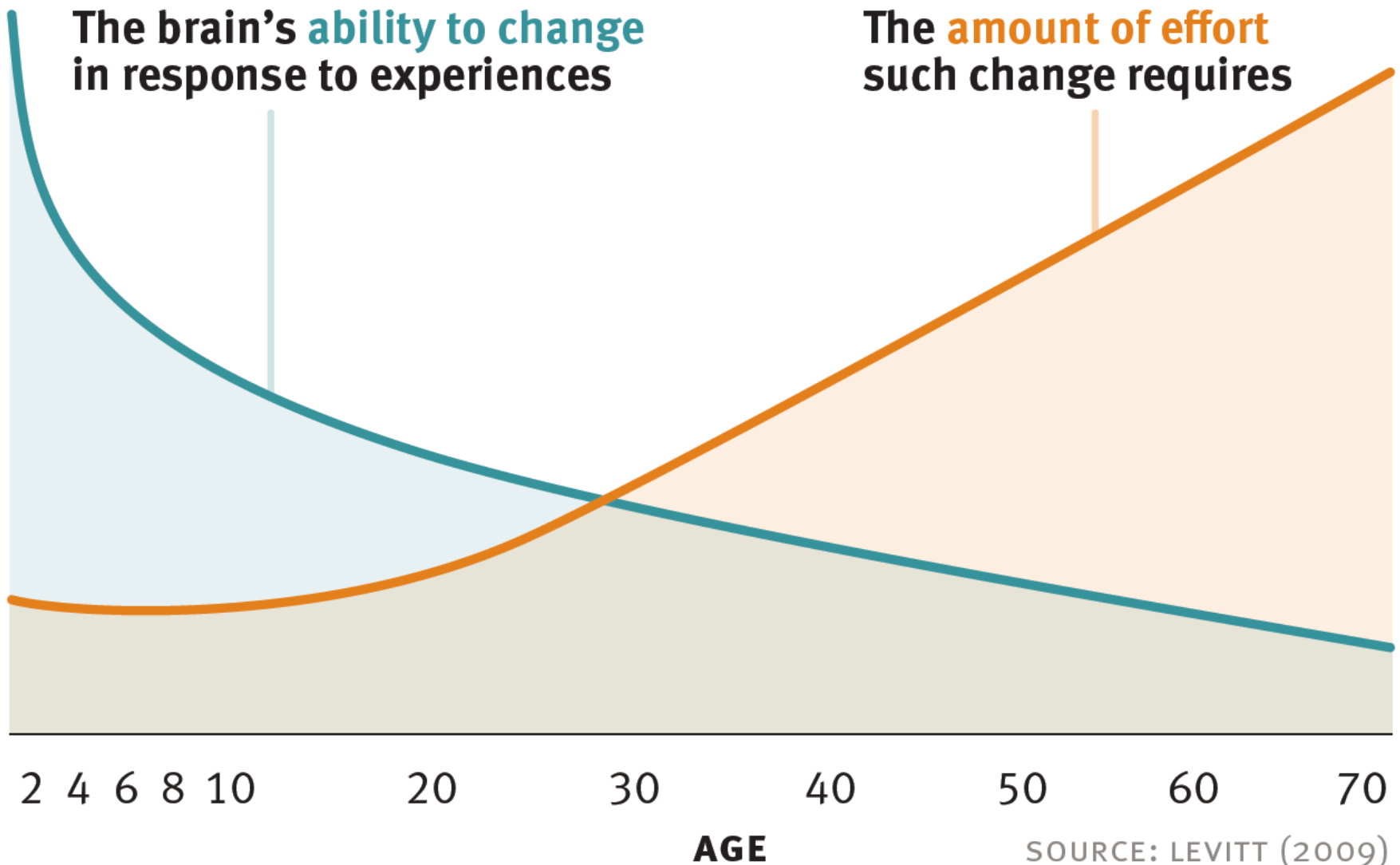


# Where Do We Go From Here?

# Building the Foundations of Resilience

Resilience is a product of our genes and experiences, like a scale that can be tipped to one side or the other.





# Alberta Family Wellness Initiative

**WHERE  
SCIENCE  
MEETS  
REAL LIFE**

[www.albertafamilywellness.org](http://www.albertafamilywellness.org)

# Infusing Brain Science into Mentoring Practice @ Big Brothers Big Sisters of Calgary and Area

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Knowledge Exchange Collaboration Dec 5, 2018



# BBBS is a Mentoring Organization

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# Our Introduction to Brain Science

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Alliance

## Change in Mind

Applying Neurosciences  
to Revitalize  
Communities

An illustration showing a large, stylized blue brain with white neural pathways. Several small human figures are positioned around the brain, appearing to hold it up or support it from different angles. The figures are in various poses, some standing and some leaning, suggesting a collaborative effort.

# Project Overview

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- Two years
- Convenings and cohort meetings
- AB cohort meetings
- Learning, training, and development
- Creating a culture of innovation (prototyping and rapid testing)
- Knowledge dissemination
- Change management and implementation

# Systems Change Stream

How will this happen?

**National**  
BBBS Canada

A. BBBS Canada has new insights into the application of brain-science informed practices.

B. BBBS Canada helps to create new brain science informed mentoring practices and standards and training to support them.

**Provincial**  
Alberta  
Mentoring  
Partnership

A. Provincial mentoring organization has new insights into the application of brain-science informed practices.

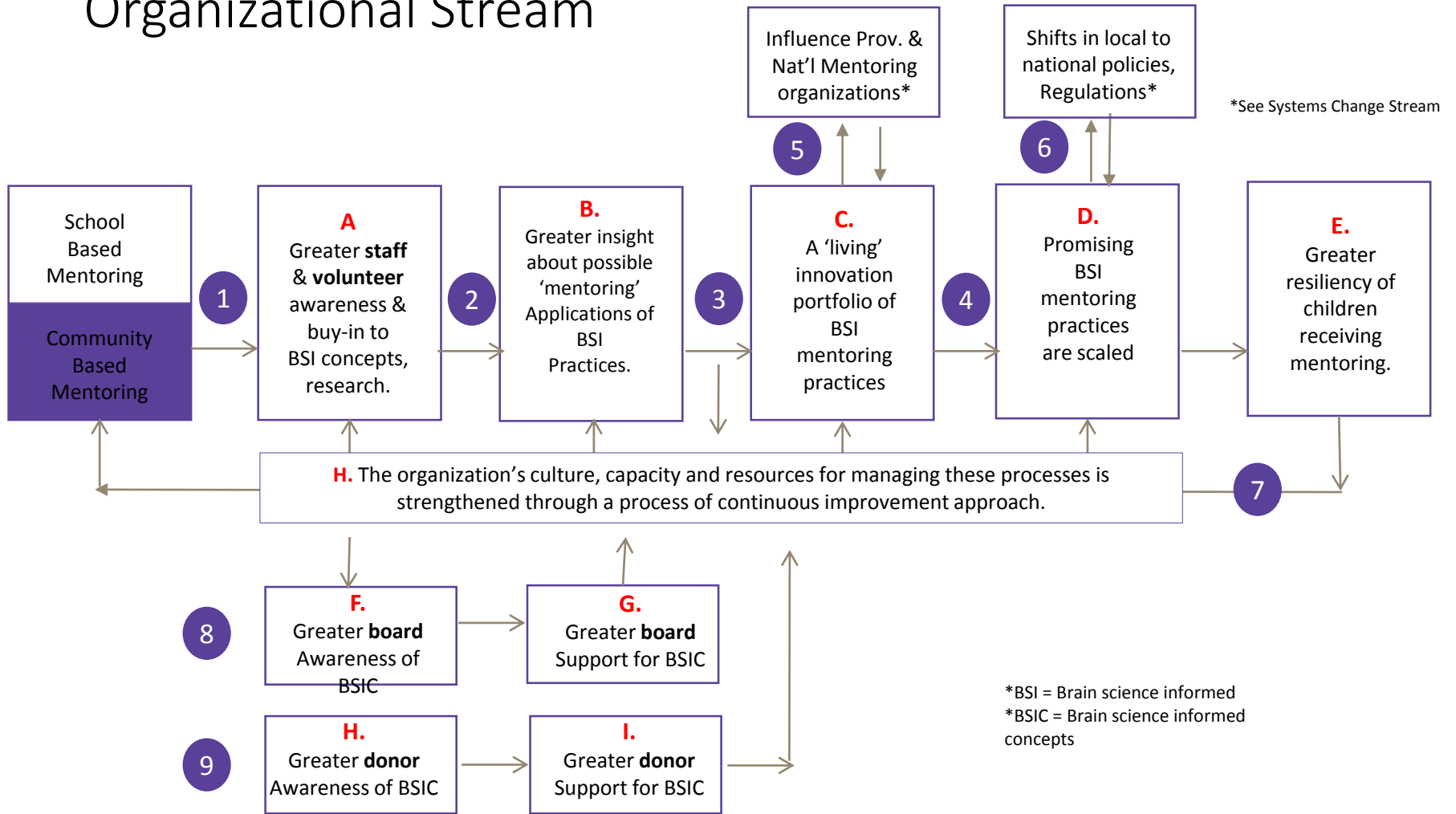
B. Provincial mentoring organization creates new brain science informed mentoring practices and standards and training to support them.

**Local**  
Family &  
Community  
Support  
Services  
(FCSS)

A. Local funding partners have new insights into the application of brain-science informed practices.

B. Local funding partners understand the impact brain science informed mentoring practices has on the quality of services provided.

# Organizational Stream



# Infusing the Brain Science Concepts

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serve & return

Toxic stress

Adverse Childhood  
Experiences

Brain architecture

Self-Regulation

Executive Functioning

Resilience

# Experimenting with Brain Science & Mentoring

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## THE INTENT

*To craft a 90 day campaign to develop, test, and upgrade 'small ways' to more systematically infuse brain science into the mentoring work of Big Brothers & Big Sisters Calgary*

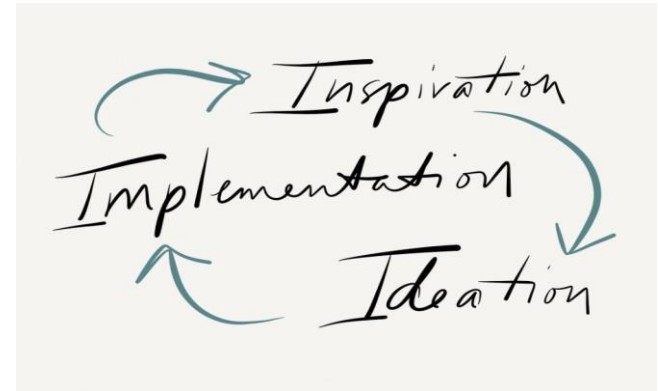
## WHY?

- 1. It may lead to stronger mentoring outcomes.*
- 2. It increases our 'brand' competitiveness vis a vis other 'emerging' mentoring organizations.*
- 3. It'll strengthen our capacity for innovation in general.*

# 90 Day Campaign

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A structured process of developing and testing ideas to infuse brain science in our work over a limited period of time.

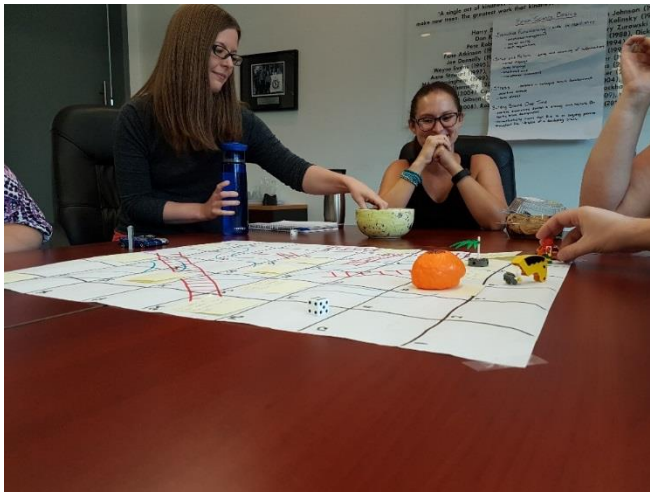




# Prototyping: A 'Living' Innovation Portfolio of BSI Mentoring Services

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## PROTOTYPE TESTING 1



## PROTOTYPE TESTING 2



# The Paradigm Shift

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HOW EXPERIMENTING WITH AND INFUSING BRAIN SCIENCE  
CONCEPTS FUNDAMENTALLY CHANGED OUR STORY

# Brain Architecture

## The **WHY** of Mentoring

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Relationships with caring,  
responsive adults (mentors)

Build Healthy

**BRAIN ARCHITECTURE**



# Serve and Return

## The **WHAT** of Effective Mentoring

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Brains are built through back and forth interactions, and for children in the middle years and youth in adolescence, these come in the form of

### **DEVELOPMENTAL RELATIONSHIPS**

that express care, provide support, challenge growth, share power, and expand possibilities\*

*\* Search Institute*

# Executive Function and Self-Regulation Processes to Inform **HOW** We Mentor

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MENTORS can  
intentionally & deliberately  
help children and youth develop  
**EXECUTIVE FUNCTION** and  
**SELF-REGULATION SKILLS** through  
practice and coaching



# Toxic Stress and ACEs

## Transformed our Understanding of **WHO** We Serve

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A recent internal study found that more than half (52%) of BBBS mentees in our 1:1 community-based programs have experienced four or more forms of adversity\*.

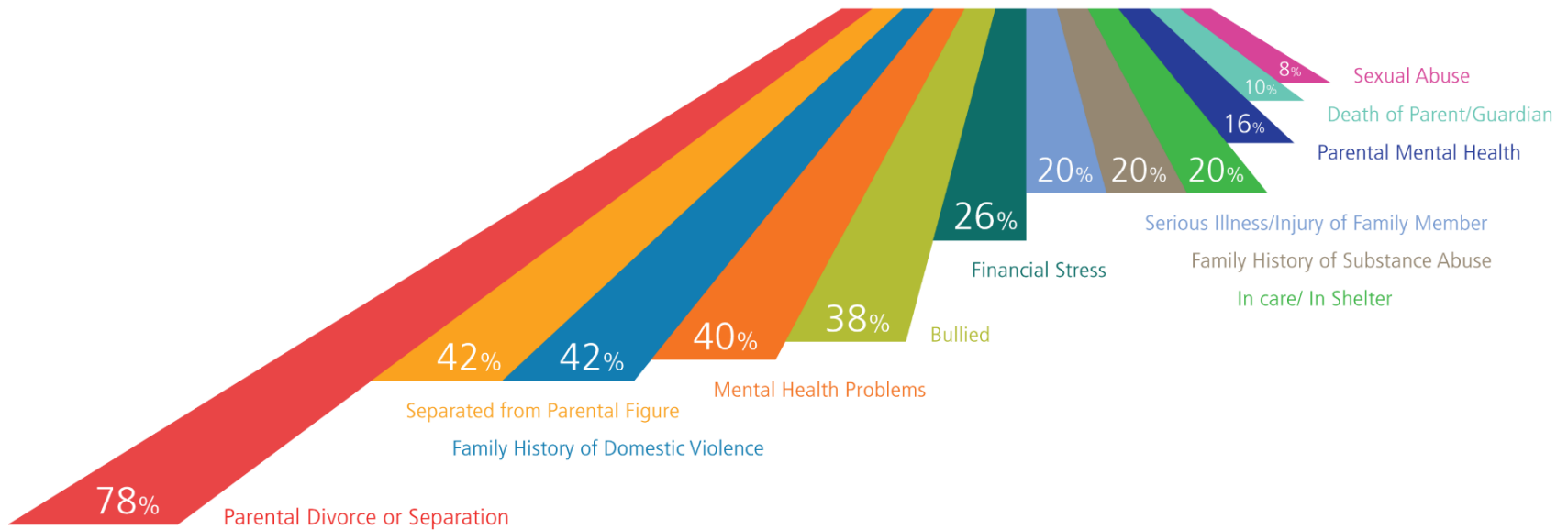
\*Qualitative data gathered at intake interviews with mentees and parents was mapped to categories identified from a preliminary internal study and from the Adverse Childhood Experiences survey. A sample of 50 Littles were randomly selected from a pool of 203 new mentoring matches made in 2016, giving us a representative sample of clients in our community-based 1:1 programs.

The Number of Adversities Experienced by 'Littles' in Community Based Programs

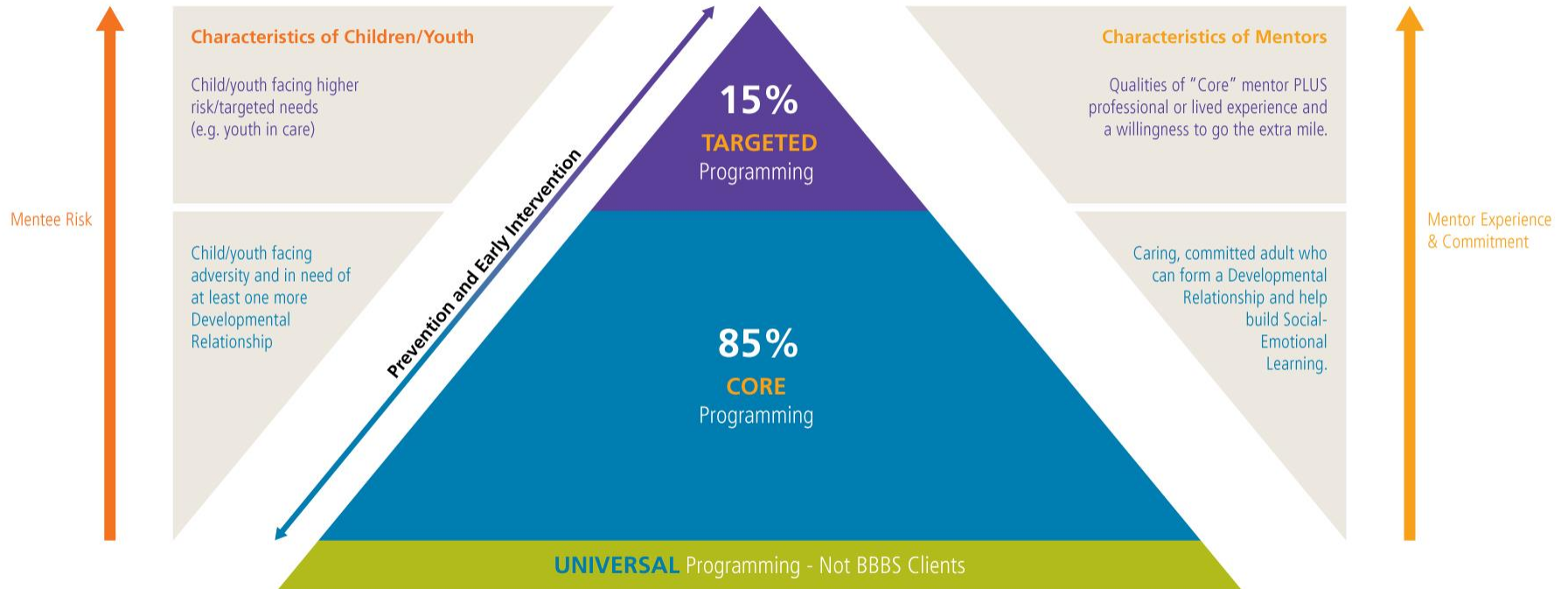




**Types of Adversity Experienced by  
'Littles' in Community Based Programs**



# Who We Aim To Serve



Programming percentages reflect approximate distribution of matches as of December 2018



# Trauma Informed Approach

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*Trauma-informed mentoring take into account an understanding of trauma in all aspects of service delivery and place priority on the young person's safety, choice, and control.*



# Resilience

## The **Ultimate Impact** of our Work

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“Whether the **burdens** come from the hardships of poverty, the challenges of parental substance abuse or serious mental illness, the stresses of war, the threats of recurrent violence or chronic neglect, or a combination of factors, the **single most common finding** is that children who end up doing well have had at least one **stable and committed relationship** with a supportive parent, caregiver, or other adult.”

*National Scientific Council on the Developing Child, 2015  
Harvard University*

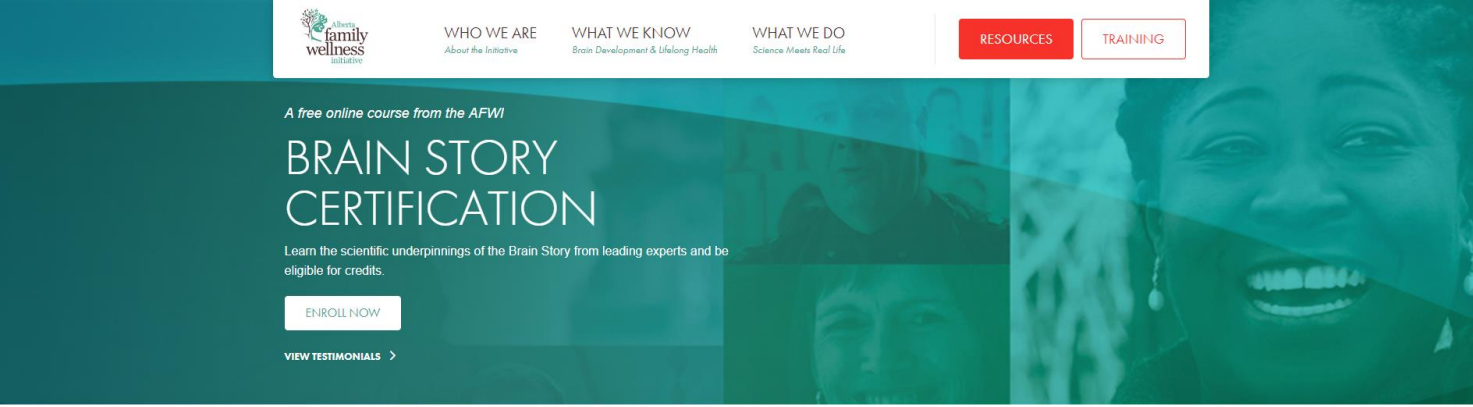
Brain Science @BBBS


More than sprinkles on top – **BAKED** right in!

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# Core Story Certification



 WHO WE ARE *About the Initiative* WHAT WE KNOW *Brain Development & Lifelong Health* WHAT WE DO *Science Meets Real Life*

[RESOURCES](#) [TRAINING](#)

A free online course from the AFWI

## BRAIN STORY CERTIFICATION

Learn the scientific underpinnings of the Brain Story from leading experts and be eligible for credits.

[ENROLL NOW](#)

[VIEW TESTIMONIALS >](#)



WHAT YOU'LL LEARN

ALREADY REGISTERED?

Continue your Brain Story education

[SIGN IN](#)



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## How did we do?

Please fill out the survey  
that will be emailed to you.





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# Thank you!

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Canada    Canada