“The brain is not fragile; the brain is adaptive. The question is whether or not those adaptations will allow you to cope with the world you are then going to live in.”

–Dr. Clyde Hertzman
The Wisdom of the Elders

Consider the interest of the next 7 generations when decisions are being made.
Adolescence is a time of growth and maturation in the brain.

www.teenmentalhealth.org
Why do we care about brain?

You are your brain.

BUT

Your brain is not just produced by your genes

Your brain is sculpted by a lifetime of experiences.

Time Magazine Dr J Stieben

Dr R Gibb UofLethbridge
The New Brain Science

Old view: Brain had fixed structure and set number of brain cells, which declined over the aging process and with damage from trauma

- New view: Brain plasticity
  - Brain can grow new cells and make new connections throughout life
  - Brain and body experience alters the structure and connections in the brain, strengthening, growing or weakening them and changing structure
Adolescents: Why **DO** they do the things they do?
“I would there were no age between ten and three-and-twenty, or that youth would sleep out the rest; for there is nothing in the between but getting wenches with child, wronging the ancienary, stealing, fighting.

... Would any but these boiled brains of nineteen and two-and-twenty hunt in this weather?”

Shakespeare, The Winter's Tale, III.iii
Mismatch- Dr Peter Gluckman

• As a society we confuse physical maturation with psychosocial maturation
• Youngsters are biologically mismatched to the society they live,
• The time needed to be fully functional as an adult has increased markedly
• Our PSYCHOSOCIAL maturation occurs AFTER our physical maturation.
Brain Regions Showing Most Change in Adolescence

Sowell et al., 1999
Brain Development

Maturation Occurs from Back to Front of the Brain

Images of Brain Development in Healthy Youth (Ages 5 – 20)

Blue represents maturing of brain areas

Source: Gogtay, Giedd, et al., 2004.
The Limbic System

- Cingulate cortex
- Septal area
- Hypothalamus
- Hippocampus
- Amygdala
Its OK Mum, Dad has already grounded me!!
Teenagers are known for risk-taking, novelty seeking, reckless behaviour and impulsivity.

Believe it or not, some degree of risk-taking in adolescence is normative (and adaptive)!

(Spear, 2000)
The Frontal Lobes

"Executive Functions"

- Governing emotions
- Judgment
- Planning
- Organization
- Problem Solving
- Impulse Inhibition
- Abstraction
- Analysis/synthesis
- Self-awareness*
- Self-concept*
- Identity
- Spirituality

DEVELOPED frontal cortex allows one to regulate emotions, solve problems effectively and plan behaviour.

Williamsgroup, 2003: Please credit Protecting You/Protecting Me (PY/PM)
Hyper-Rational
Grey matter development in prefrontal cortex

Frontal grey matter volume peaks around puberty

Boys

Girls
The Social Brain

Perceiving emotion in others requires the collaboration of disparate brain regions. To read feeling in a face, the amygdala, an emotion hub, works with the fusiform face area, which is dedicated to face recognition. The medial prefrontal cortex and superior temporal sulcus read mood regardless of whether the cues come from a face, body or voice. They receive data from visual and auditory cortices, which process sights and sounds.

- Prefrontal cortex
- Medial region
- Orbitofrontal region
- Amygdala
- Superior temporal sulcus
- Fusiform face area
- Auditory cortex
Limbic System

Do it Now!

Prefrontal cortex

Think about it
PEER POWER
3 Key Points of Brain Maturation

- The brain matures by becoming more specialized (gray matter) and more "connected" (white matter).

- A changing prefrontal/limbic balance affects reward circuitry, hot vs cold cognition, temporal discounting, and decision making.

- Enormous plasticity confers both vulnerability and opportunity.
Scenarios

- What we Think….

- Affects how we feel….

- Affects how we act….
The Fear Response: Fight or Flight and Stress

Visual Thalamus

Visual Cortex

Amygdala

Scientific American
The Hidden Mind, 2002, Volume 12, Number 1
Imagine you are walking home and you see a bear...
What happens when the bear is always there...

- Irritability
- Poor memory
- Difficulty focusing
- Critical thinking difficulty
- Increased anxiety and fear
A: Positive emotional state, flow through amygdala to PFC and better memory test results.

B: Stressed state: No passage of information to PFC & lower memory testing short and long-term.

(Hamman, et al. *Cognitive Neuroscience.*)
What emotion do you see?
WHAT YOU SEE IS WHAT YOU GET!

Fear  Contempt  Surprise  Anger

Disgust  Sadness  Happiness

YURGELUN_TODD
Adolescents use the **Amygdala** (fight or flight response) rather than the **Frontal Cortex** (used by older adults) to read emotions.
Sleep is very important during periods of brain maturation!
This means that although many teenagers get less sleep than younger children, there is actually an increase in sleep needs during the teenage years!
As the adolescent brain is reconfigured it is more susceptible to long lasting damage of drugs, alcohol, and negative experiences. Unfortunately, the brain is most vulnerable at a time when they are most inclined to take risks and to act impulsively…”

(Jay Giedd, NIH 2004)
Peer INfluence
However, in a world of fast cars, readily available drugs and alcohol, this combination simply puts teens at increased risk.
Scenarios

- What we Think….
- Affects how we feel….
- Affects how we act….
Resources

www.teenmentalhealth.org

www.teensteps.org

www.mindyourmind.ca

http://www.btslessonplans.org

www.gettingtobetter.ca

http://www.children.gov.on.ca/htdocs/English/topics/youthopportunities/steppingup/contents
Books Mentioned

- Brain storm - Dan Siegel
- Whole Brain Child – Dan Siegel
- Mindset – Carol Dweck
- Drive - Dan Pink
- Raising your spirited child – Mary Sheedy Kurcinka
- Discipline Kids are Worth it Barbara Coloroso
- Adolescent Therapy that Really Works
  - Jane Sasson Edgette
- You and your Adolescent
  - Laurence Steinberg
- Hold Onto your Kids
  - Gordon Neufeld Gabor Mate
“Everyone has a right to have a future that is not dictated by the past.”

Karen Saakvitne
Strengthening Our Future:

Key Elements to Developing a TRAUMA-INFORMED Juvenile Justice Diversion Program for Youth with Behavioral Health Conditions
Principles of Trauma Informed Care

- Understanding Trauma and Its Impact
- Promoting Safety
- Ensuring Cultural Competence
- Supporting Consumer Control, Choice and Autonomy
- Sharing Power and Governance
- Integrating Care
- Healing Happens in Relationships
- Recovery is Possible
MAKING SERVICES WORK FOR ABORIGINAL YOUTH INVOLVED IN ONTARIO’S JUSTICE SYSTEM