NW Children’s Fund
present
The Amazing Adolescent Brain
Challenges, Opportunities and Promising Interventions

Featuring:

Mona Lee Locke
Welcome & Opening Remarks

Linda Chamberlain, PhD, MPH
Keynote Speaker

and panelists from:

Cocoon House
SafeFutures Youth Center
Treehouse

nwcf.org

PREMIER FORUM SPONSOR: Thomas V. Giddens Jr. Foundation
BENEFACTOR: The Boeing Company
LEADERS: Ellison Foundation & Foundation for Healthy Generations
PATRON: Thrive Washington
MEDIA SPONSOR: ParentMap
Introductions

William H. Strong
Board Member & Grants Chair, NW Children’s Fund
Welcome & Opening Remarks
Mona Lee Locke
Former First Lady of Washington State, Early Learning Advocate
The Amazing Adolescent Brain

Linda Chamberlain PhD MPH
www.drlindachamberlain.com
What We’re Talking About

• Changes occurring in adolescent brain
  ▫ Implications of stress and trauma
• Communicating effectively with teens
• Why risk-taking looks different to an adolescent brain
• The Adolescent Brain and Substance Use
1. By age 6, a child’s brain is nearly the size of an adult brain. **True (1) or False (2)**

2. The human brain weighs about the same as an average grapefruit (1) or cabbage (2).

3. The cortex is one of the **first (1)/last (2)** areas of the brain to develop.
The Adolescent Brain is a Work in Progress

Adolescent brain science is in its infancy!

UPGRADING THE HARD DRIVE

1. GRAY MATTER PEAKS AROUND PUBERTY
2. SYNAPTIC PRUNING → EFFICIENCY & SPECIALIZATION
3. MYELINATION: INSULATION → SPEED & INTEGRATION

INFORMATION SUPER HIGHWAY
THE BRAIN’S CEO

Frontal Cortex

- Impulse control
- Judgment
- Problem solving
- Emotional processing & self-control
- Language
- Organization & planning
- Motivation
- Goal setting behaviors
Executive Function (EF)

• Cognitive skills needed for goal-directed behavior including planning, response inhibition (impulse control), working memory & attention (Johnson, Blum & Giedd et al, 2009)

• Deficits in working memory & response inhibition (EF) increase risk of substance abuse during adolescence (Squegaglia & Gray, 2016)

• Unaddressed childhood trauma can lead to EF deficits
What can a maturing frontal cortex look like in terms of behaviors?

- More rigid thinking-harder to see all the options can lead to decisions that seem irrational to us
- Good decision-making comes from experience
- Teen brain has to work harder until it gets all of its connections
- Teen brain gets stressed out more easily
We need to feel safe to think and learn, but stress can push us DOWNSTAIRS in our brain...

UPSTAIRS: THINKING & LEARNING BRAIN
- Trouble focusing at school or work
- Say or do things impulsively
- Lose temper easily
- Can’t get along with others

DOWNSTAIRS: SURVIVAL BRAIN
- Relationships, Setting priorities
- Reading, Speech, Regulating emotions
Multi-Tasking is a Myth

Can you think of any mixed messages we send to teens?
Impact of Stress on Adolescent Brain

Adolescents who experienced childhood maltreatment have lower performance on executive function (EF) tasks including working memory, verbal fluency and inhibition (Smith, Henry & Messner, 2014).

Poor EF Function may occur because youth are more attuned to danger, making it more difficult to process verbal information, follow directions & remember what is being said (McCrorry et al, 2011; Steele, 2002).
Stress, Trauma and the Adolescent Brain

• Key areas of brain involved in human stress reactivity — hippocampus, amygdala & prefrontal cortex—are undergoing major changes during adolescence

• Structural changes in these areas of the brain in response to stress during adolescence (Eiland & Romeo, 2013)

Adolescents (13-17 y.o.) have higher levels of cortisol in response to stress than children (7-12 y.o.) Stroud et al, 2009
What Do Teen Brains Need?

1. Lots of hands-on, skill-based learning

2. Opportunities to discover and pursue new interests

3. Opportunities to practice personal control, decision making and leadership

4. Tools to build brain connectivity and manage stress

To be honored for their creative and innovative thinking
Cross-lateral Exercise: Switching
Acupressure Points

- **Crisis, Panic, Dizziness**
  Beneath nose on upper lip

- **Stress**
  ▫ On top of shoulder
Changes in Other Regions of the Brain During Adolescence

LOBES OF THE CEREBRUM
Corpus Callosum

• Thick cord connecting right and left hemispheres
• Creativity and higher type of thinking
• Continues to grow into 20’s
Cerebellum: Use It or Lose It!

- Muscle movements, balance, and complex cognitive processes
- Changes most during teen years and continues to grow into early 20’s
- Physical exercise boosts brain function & learning

Naperville School District 203
LIMBIC SYSTEM:
EMOTIONAL CORE OF THE BRAIN

©BrainConnection.com
What emotion do you see?

Permission to use photo from Dr. Yurgelun-Todd
Teens Use Less of the Prefrontal Region compared to Adults

Yurgelun-Todd, D. Frontline Interview; permission to use graphics from Dr. Yurgelun-Todd
http://www.pbs.org/wgbh/pages/frontline/shows/teenbrain/interviews/todd.html
Communication Gap

The teen brain:

- More likely to misinterpret facial expressions of emotion
- Uses less of the prefrontal cortex to interpret facial expressions
- Processes more in amygdala
  - Reacts more quickly
  - Sees anger when it isn’t intended

See Frontline Interview with Dr. Yurgelin-Todd
What are some of possible effects when an adult does not express anger constructively with an adolescent?

- Becomes angry/emotional
- Doesn’t focus on behavior that needs to change
- Weakens relationship
- Less likely to ask for advice for other problems

http://www.drdansiegel.com/resources/everyday_mindsight_tools/
“What were you feeling?”

vs.

“What were you thinking?”

#1 Recommendation for effective adult-teen communication?
Expressing Anger Constructively

• Tell the person how you feel: “I’m...”

• Identify the specific event that led to how you are feeling: “I’m feeling __ because...”

• Explain what the event produced that feeling (how it effected you): “The reason I feel __ is that....

• Explore what the options are to address the problem and make a plan: “What can we do to solve this...?”

Guiding Good Choices
Essential Communication Tools

1. Less is more---use fewer words!
2. Use “I” statements to talk about feelings
3. Be aware of your body language and expressions
4. Use open-ended questions to ask teens what they are feeling
5. Validate their feelings without judgment
6. Time-out is for teens and adults too!
7. Practice active listening
8. Timing is everything
Fingerhold Practice

• Simple technique that combines breathing and holding each finger

• Practicing fingerholds can help with emotional literacy to manage emotions and stress

• Used with adults and children

• Done by yourself or with another person

National Center on Domestic Violence, Trauma and Mental Health

How many hours of sleep per night do adolescents need?

1. 6
2. 7.5
3. 8
4. 9.5
Adolescent Brains Need More Sleep

- Brain sleep centers are in transition during adolescence
- Melatonin is secreted up to 2 hours later at night
- Teens need 9 to 9 ½ hours of sleep
<table>
<thead>
<tr>
<th>Adolescent Sleep Deprivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compromises REM sleep and learning</td>
</tr>
<tr>
<td>Mimics symptoms of ADHD</td>
</tr>
<tr>
<td>Increases symptoms of depression</td>
</tr>
<tr>
<td>Decreases ability to control emotions</td>
</tr>
<tr>
<td>Increases aggressive behaviors</td>
</tr>
<tr>
<td>Increases risk of obesity</td>
</tr>
</tbody>
</table>
Proactive Strategies

1. Start the day with interactive activities and movement
2. Assess sleep patterns with teens who are struggling in school, having behavioral problems, or other mental health issues
3. Schedule more challenging activities later in the day
4. Limit technology in bedroom!
RISK-TAKING AND THE ADOLESCENT BRAIN

“Hot cognition”-conditions of high emotions or conflict are often the riskiest for adolescents

Johnson, Blum & Giedd, 2009
LIMBIC: “Let’s Just Do It!”

Frontal Cortex: “Let’s Think It Through First…”

Neurodevelopmental tug-of-war

DOPAMINE

“Mismatch Model”
Blakemore & Robbins, 2012
Dumontheil, 2016; Mills et al, 2014

Vorobyev et al, 2015

Peers
High emotions

Not mature yet
Cross talk
Three Most Consistent Adolescent Behavioral Changes Across Cultures

1. Increased novelty seeking
2. Increased risk taking
3. Social affiliation shift toward peer-based interactions

Development & acquisition of survival skills

Johnson et al, 2009
Teens Weigh Risks Differently

- Dopamine has major role in creating drive for reward
- Increased activity of neural circuits utilizing dopamine→**enhanced dopamine release**
  - ↑impulsiveness without reflection
- **Hyper-responsive to rewards** during adolescence—think in concrete terms, less likely to see big picture
  - Place more weight on positive outcome vs. possible negative results—PROS outweigh the CONS
What can this look like in terms of behavior?

- Thinking one thing and feeling another
- Act from impulses that differ from thoughts or feelings
- Misread or misinterpret social cues
- Engage in risky or inappropriate behavior
Depression and Risk Behaviors

- Half of lifetime mental health disorders start by age 14
- 30% of teen report depressive symptoms at any given time
- Depression is linked to
The emergence of psychiatric illnesses during adolescence including anxiety & mood disorders, psychosis, eating disorders, personality disorders and substance abuse is increasingly understood as arising from aberrations of the maturational changes occurring during adolescence.

Paus, Keshavan & Giedd, 2008; Dumontheil, 2016
Among adolescents, childhood adversities account for:

- **15.7%** of fear disorders
- **32.2%** of distress disorders
- **34.4%** of substance use orders
- **40.7%** of behavior disorders

44% of low income youth with 5 or more ACEs have a mental health problem compared to 11% of youth with no ACEs

WA state, Lucenko et al, 2012

McLaughlin et al, 2012
ACEs and Adolescent Violence Perpetration

• For boys and girls, each ACE is significantly associated with violence perpetration (bullying, physical fighting, weapon carrying, self-mutilation, suicide attempts)

  ▫ Risk increased dramatically with each additional ACE → Dose Response Relationship

Duke et al, 2009
“Neuroscience suggests that mediating the impact of adverse childhood experiences involves not only education and emotional and practical support but also the introduction and application of neurological repair methods such as mindfulness training.”

Bryck et al, 2012
Lorena Jimenez De Sepin
Bilingual Youth Case Manager

SafeFutures Youth Center

SafeFutures empowers and advocates for underserved young people from low-income communities and communities of color to maximize their potential.

SafeFutures’ prevention and intervention programs and services aim to reduce youth involvement in the juvenile justice system, gangs and school truancy and drop out.

*SafeFutures has received 12 NWCF grants since 2004.*
Sarah Pulliam
Program Manager, Maternal Group Home
Cocoon House

Cocoon House empowers young people, their families and the community to break the cycle of homelessness through outreach, housing and prevention.

Cocoon House’s spectrum of services include two emergency shelters, two long-term transitional housing facilities, mobile street outreach, a drop-in day center, case management, advocacy, as well as an award-winning prevention program for parents with at-risk teens.

*Cocoon House has received 13 NWCF grants since 2000.*
Getting Grounded and Centered

Stand tall, raise your arms up to the sky and imagine your feet are planted firmly and growing roots into the Earth.

www.capacitar.org
Learning to Breathe (L2B)

- Integrates SEL with components of Mindfulness-Based Stress Reduction (MBSR) for adolescents
  - Emotional regulation skills adapted from therapeutic interventions
- 6 core lessons that address body awareness, working with feelings, reducing harmful judgments and integrating mindful awareness into daily life
- High school students who completed L2B had lower levels of stress and improved emotional regulation skills (Metz et al, 2013)

http://learning2breathe.org
Proactive Strategies

1. Opportunities for positive risk-taking and leadership with adult guidance
2. Give teens active role in discussing rules, curfews, and consequences for their behaviors
3. Teach teens how their brains work
How important is it for children and youth to understand how their brain works?

Growth mindset (belief that intelligence/brain is not fixed and can be developed) buffers the negative effects of poverty on academic achievement

Claro, Dweck, Paunesku, 2016
The Adolescent Brain and Alcohol and Substances: Implications and Prevention

In the U.S., 30% of youth have used alcohol by the 8th grade. 69% have used alcohol by the time they graduate high school and 24% of 12th graders were binge drinking in the past two weeks. (Johnson et al, 2013)
True or False Whip Around

1. At the same blood alcohol levels, adolescents are more likely to show the effects of intoxication on muscle coordination compared to adults.

2. At the same blood alcohol levels, adolescents are more likely to black-out than pass-out compared to adults.

3. The earlier a person starts drinking, the more likely they are to become dependent on alcohol.

4. The impact of marijuana on the brain suggests that some of the same areas of the brain that are affected by alcohol are also affected by marijuana.
Adolescents are affected differently by repeated, heavy drinking

- Increased vulnerability to black-outs
- Higher levels of alcohol-impaired memory and executive function (EF)
- Reduced sensitivity to the sedative effects of alcohol
- Reduced sensitivity to the effects of alcohol on motor coordination

Hippocampus

- “Switchboard” between short- and long-term memory = gateway to learning
- Smaller hippocampus in alcohol-using adolescents
Teens Need to Understand How Substances Affect Their Brains Differently

http://learn.genetics.utah.edu/content/addiction/
Adult Alcohol Addiction, Brain Changes, & Intervention

**Treatment strategy**: conditioning to over-ride amygdala
Strengthen PFC (Prefrontal Cortex)
ADVERSE CHILDHOOD EXPERIENCES AND TEEN ALCOHOL USE

Teens exposed to ACEs are more likely to:

- to start drinking alcohol by age 14
- binge drink
- say that they drank to cope during their first year of drinking

Dube et al, 2006
Some Considerations for Trauma-Informed Practices and Parenting

• Risk of misreading emotions and responding inappropriately

• Greater sensitivity to symptoms of trauma and PTSD that are not recognized or are attributed to other problems/diagnoses [ADHD, ODD...]

  ▫ Symptoms/responses to childhood trauma emerging during adolescence
Persisting Effects of Marijuana Use Among Adolescent Users

- Poorer verbal learning, verbal working memory and attention accuracy at 3 weeks abstinence (Hanson, Winward, Schweinsburg et al, 2010)

- Lower IQ and slower executive function after 18 months of abstinence among adolescents with Cannabis Use Disorder (Camchong, Lim & Kumra, 2016)
Prevention Strategy: Refusal Skills

1. Ask questions.
2. Name the trouble: “That’s….”
3. Identify the consequences: “If I do that…”
4. Suggest an alternative: “Instead, why don’t we…”
5. Move it, sell it, leave, but leave door open: “If you change your mind…”

Refusal skills are taught in the following evidence-based prevention curricula for teens and parents: The 4th R, Life Skills, Guiding Good Choices, Staying Connected with Your Teen.
Prevention Paradigm Shift

The strategy that was most effective to get teens to avoid smoking tobacco wasn’t frightening images or information about the harmful effects. The strategy that worked was informing them about how adults who owned cigarette companies were brainwashing them to smoke so they could get their money. Why was this so effective?

Take Home Message:
Use approaches that encourage reflection on values
Preventure

- Personality-targeted, school-based intervention to prevent alcohol & drug use in high-risk teenagers
- Students with high-risk personality profiles identified with screening questionnaire
  - Sensation-seeking
  - Impulsivity
  - Anxiety sensitivity
  - Negative thinking

Contact: Dr. Patricia Conrod
Department of Psychiatry,
University of Montreal
Two 90-minute group workshops motivate adolescents to understand how their personality style can lead to certain emotions & behaviors.

Facilitated by teacher or mental health practitioner who has attended 2-3 day training & 4 hours of supervised practice.

Student and teacher manuals provided.
Preventure Outcomes

- **Reduced alcohol consumption**
  - 40% ↓ risk in intervention group maintained at 6-month follow-up
  - ↓ problem drinking for 24-month follow-up
  - Less likely to consume alcohol & experience alcohol-related harms in 3-year follow-up

- **Delayed initiation of alcohol use and binge-drinking**
  - 55% reduction in binge drinking at 6-month follow-up among students who reported use at baseline
  - Less likely to binge drink at 3-year follow-up

Preventure

• Reduced likelihood of initiating use of marijuana, cocaine and other illicit drugs sustained over 2-year period

• Reduced frequency of illegal drug use
  □ Over 2-year follow-up, there was significant ↑ in number of drugs used as well as frequency of use

Mahu, Doucet, O’Leary & Conrod, 2015
The “Fourth R”

• Relationship-based approach to prevent adolescent violence & related risk behaviors
  ▫ Peer and dating violence
  ▫ Substance use and abuse
  ▫ Healthy growth and sexuality

• 21 skill-based lessons; in-school and after-school curricula

https://youthrelationships.org/
Janis Avery
Chief Executive Officer and Adoptive Mom

Treehouse

Treehouse is Washington’s leading nonprofit organization addressing the academic and other essential support needs of children in foster care. Treehouse helps 8,000 kids in foster care each year through programs that help them succeed in school, fulfill key material needs and provide important childhood experiences every child deserves.

Treehouse has received 22 NWCF grants since 1994.
Thank you for joining us today!

PREMIER SPONSOR: Thomas V. Giddens Jr. Foundation
BENEFICTOR: The Boeing Company
LEADERS: Ellison Foundation & Foundation for Healthy Generations
PATRON: Thrive Washington
MEDIA SPONSOR: ParentMap