CHIRS
Community Head Injury Resource Services

Substance Use and Brain Injury: Tips to improve supports.

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Neuropsychologist

Acknowledgements

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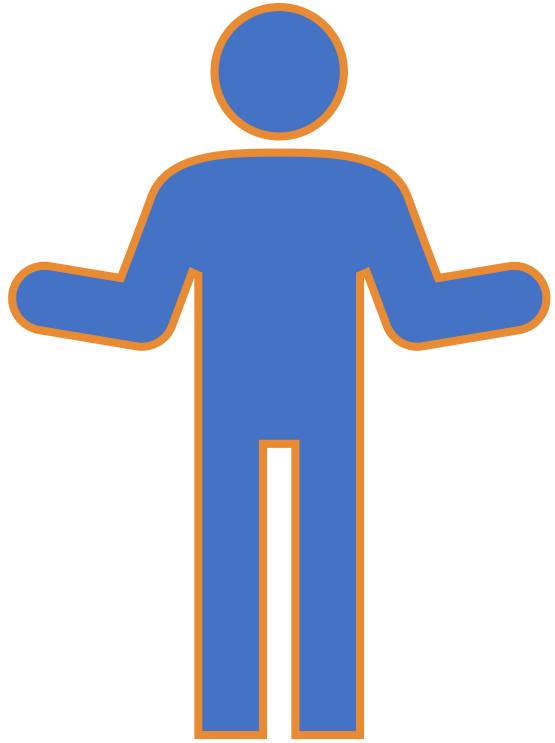
Objectives

- Understand the intersection between brain injury and substance use disorders.
- Identify recommendations for accommodating the impact of brain injury.
- Learning about resources for learning more about accommodating brain injury.
- Increase awareness of available community resources.

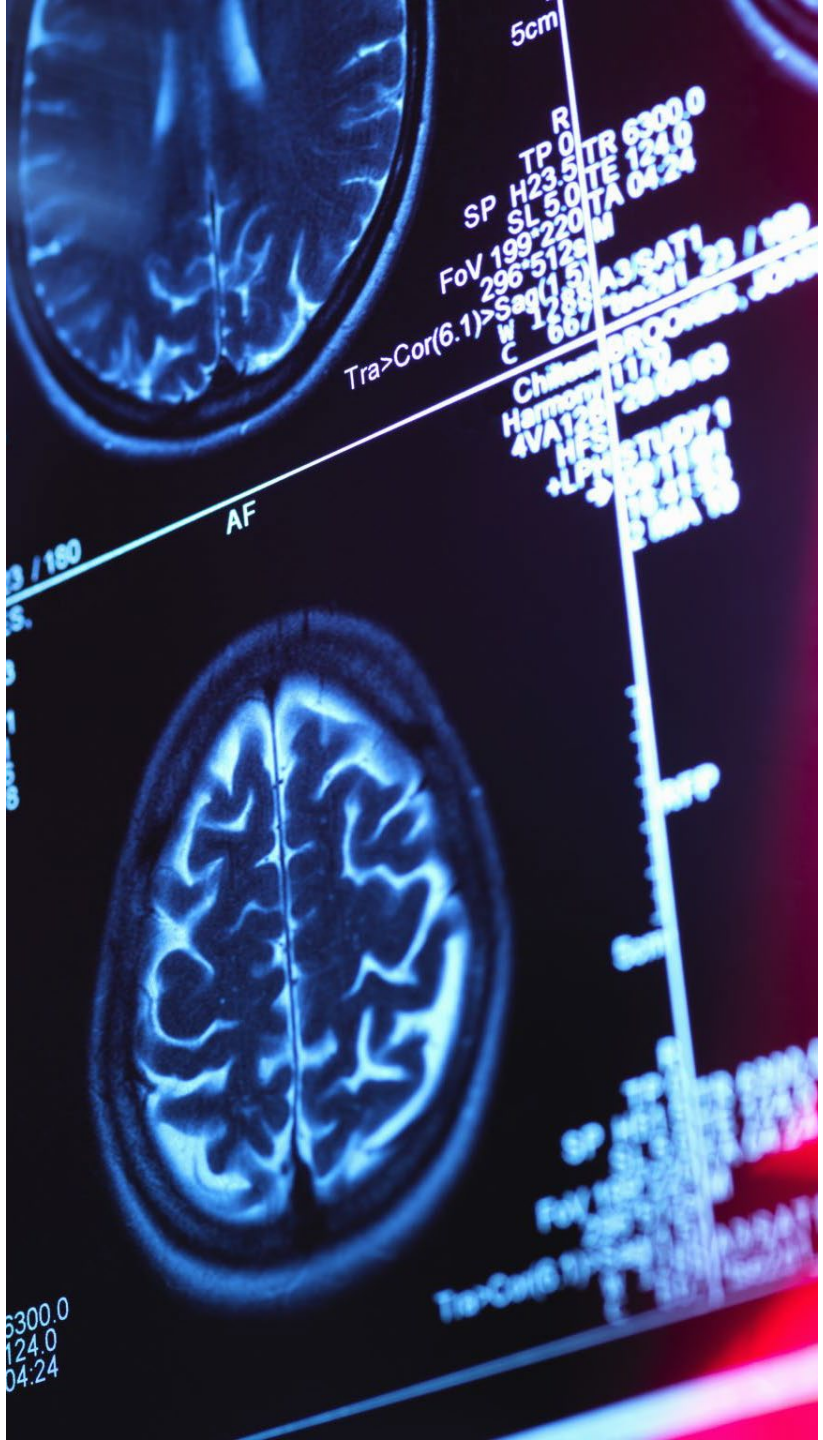
What neurocognitive roadblocks look like…

- Missed appointments
- Disinterest
- Lack of empathy
- Repeated ER visits
- Gap between ‘say and do’.
  - Reluctance to plan “awareness”
  - Forgetting the intention “goal neglect”
  - Impulsivity



Overview

- What is a brain injury?
- How do brain injury, substance use and mental health intersect.
- What to do
  - Accommodations and Resources



American Association of Neurosurgeons define traumatic brain injury as…

…a disruption in the normal function of the brain that can be caused by a blow, bump, or jolt to the head, the head suddenly and violently hitting an object, or when an object pierces the skull and enters brain tissue. Observing one of the following clinical signs constitutes alteration in the normal brain function:

- Loss of or decreased consciousness
- Loss of memory for events before or after the event (amnesia)
- Focal neurological deficits such as muscle weakness, loss of vision, change in speech
- Alteration in mental state such as disorientation, slow thinking, or difficulty concentrating

Symptoms of a TBI can be mild, moderate, or severe, depending on the extent of damage to the brain. Mild cases may result in a brief change in mental state or consciousness. Severe cases may result in extended periods of unconsciousness, coma, or even death.

Observing one of the following clinical signs constitutes alteration in the normal brain function:

…

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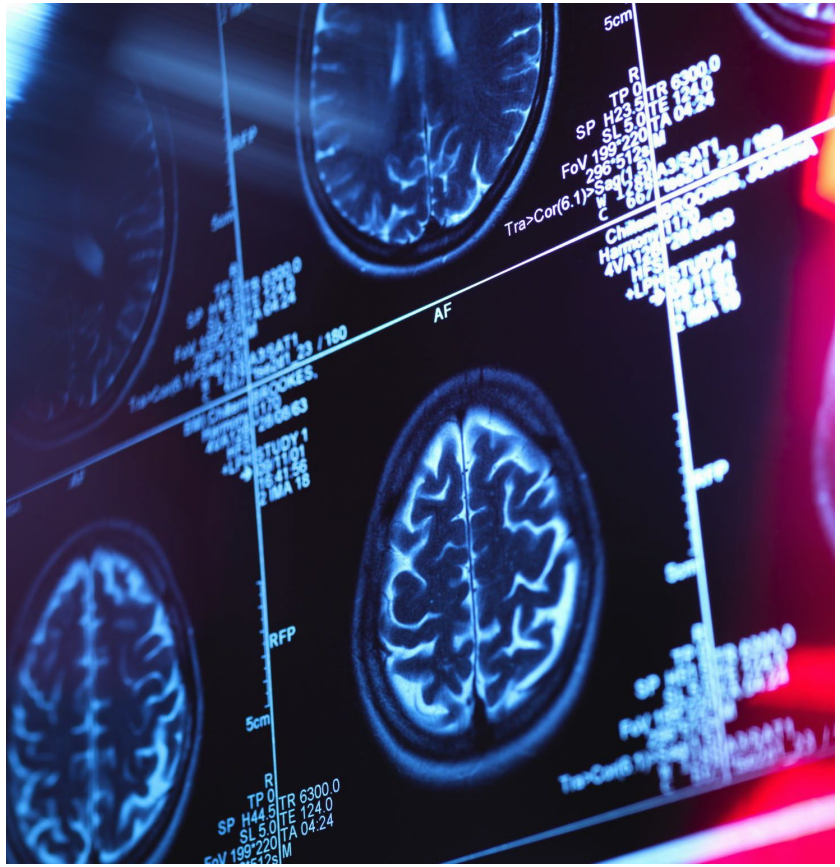
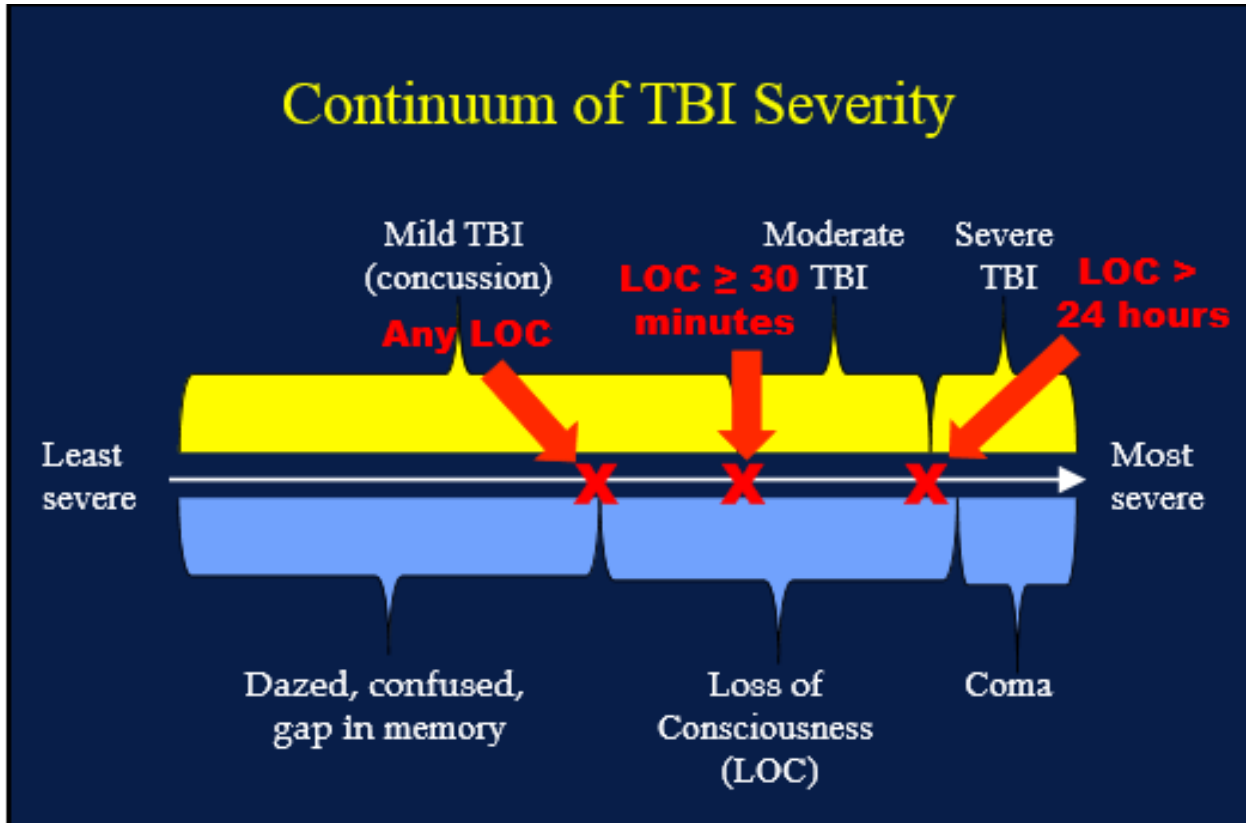


The primary index of severity is the length and depth of alteration of consciousness.



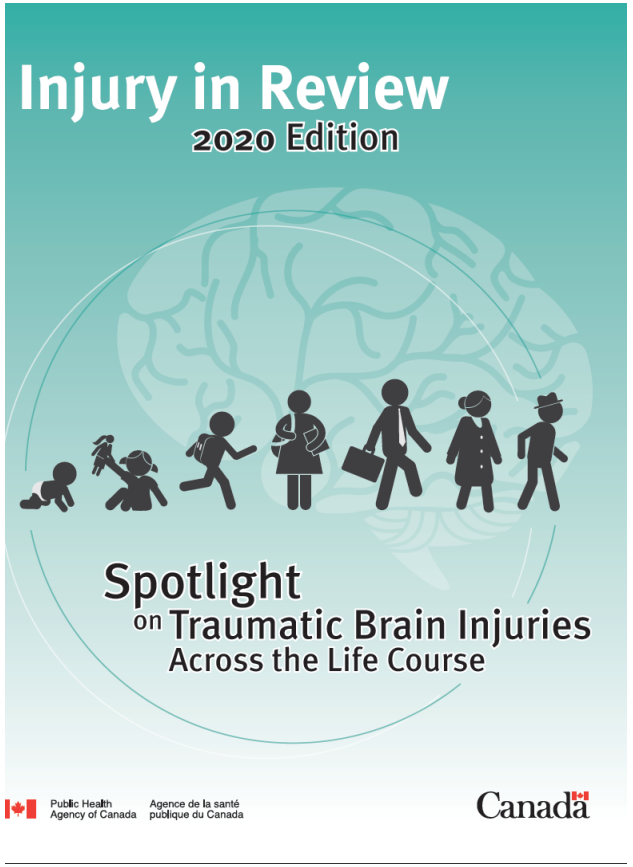
Incidence and Prevalence of Traumatic Brain injury

- Canadian Community Health Survey: 1.6% of the population 12 years or older sustained one or more concussions during 2019 (Champagne et al., 2023).
- Brain Injury Canada: 500 out of 100,000 population (extrapolated from US data).
- **Lifetime Prevalence** (Corrigan, Yang, Singichetti, Manchester and Bogner, 2017).
    - Non-institutionalized adults 18 years + in Ohio.

        21.7% reported one brain injury with loss of consciousness

        2.6% experienced at least one moderate to severe injury.

        9.1% had experienced an injury with loss of consciousness before the age of 15 years.



About Brain Injury outcomes

- Outcomes are correlated with but not fully determined by injury severity.
- Repeated mild injuries (e.g. blast and sub-concussive hits from sports) can have a cumulative effect, and lead to adverse long-term outcomes.
- It isn’t just the injury it’s the brain that’s injured…Age and health are important determinants of outcomes.

Pattern of Injury

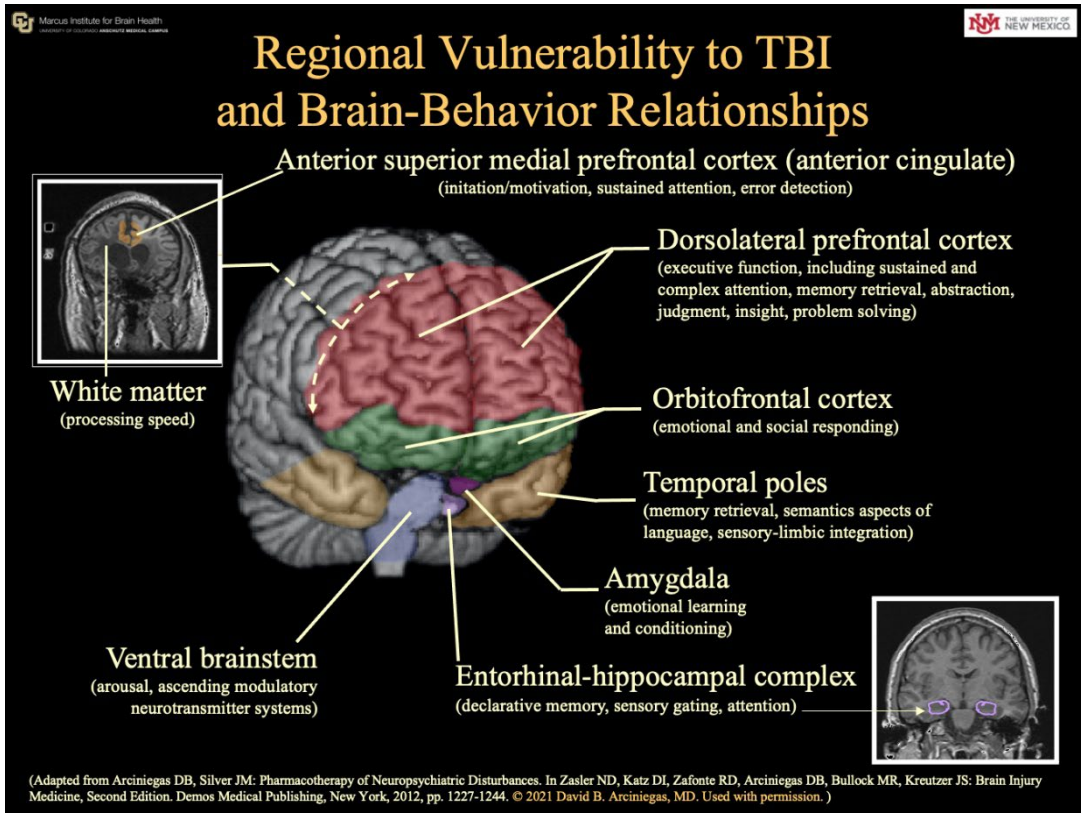


Image used with permission, Arciniegas et al., 2021

The Fingerprint of TBI

Neuroanatomy of Reward

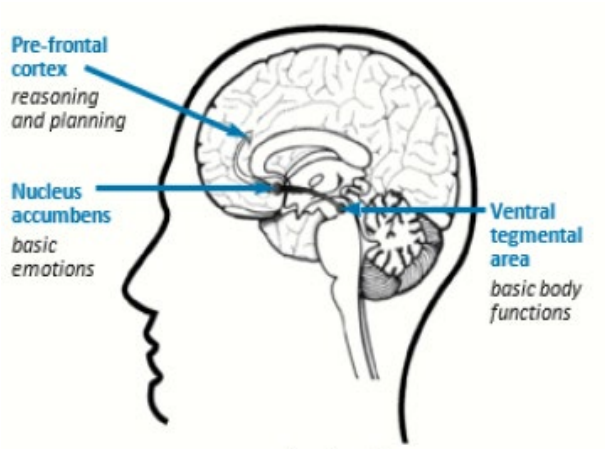
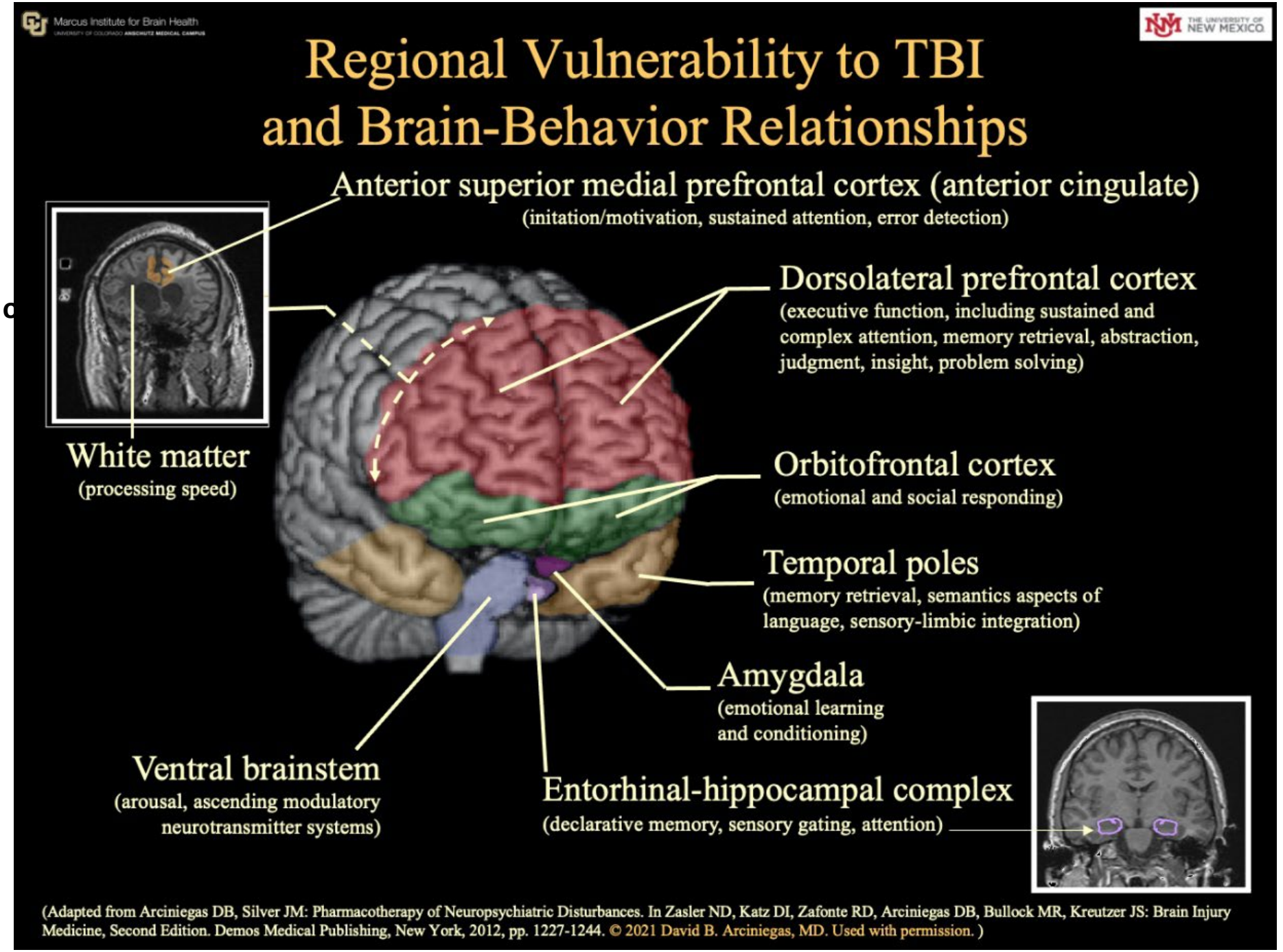
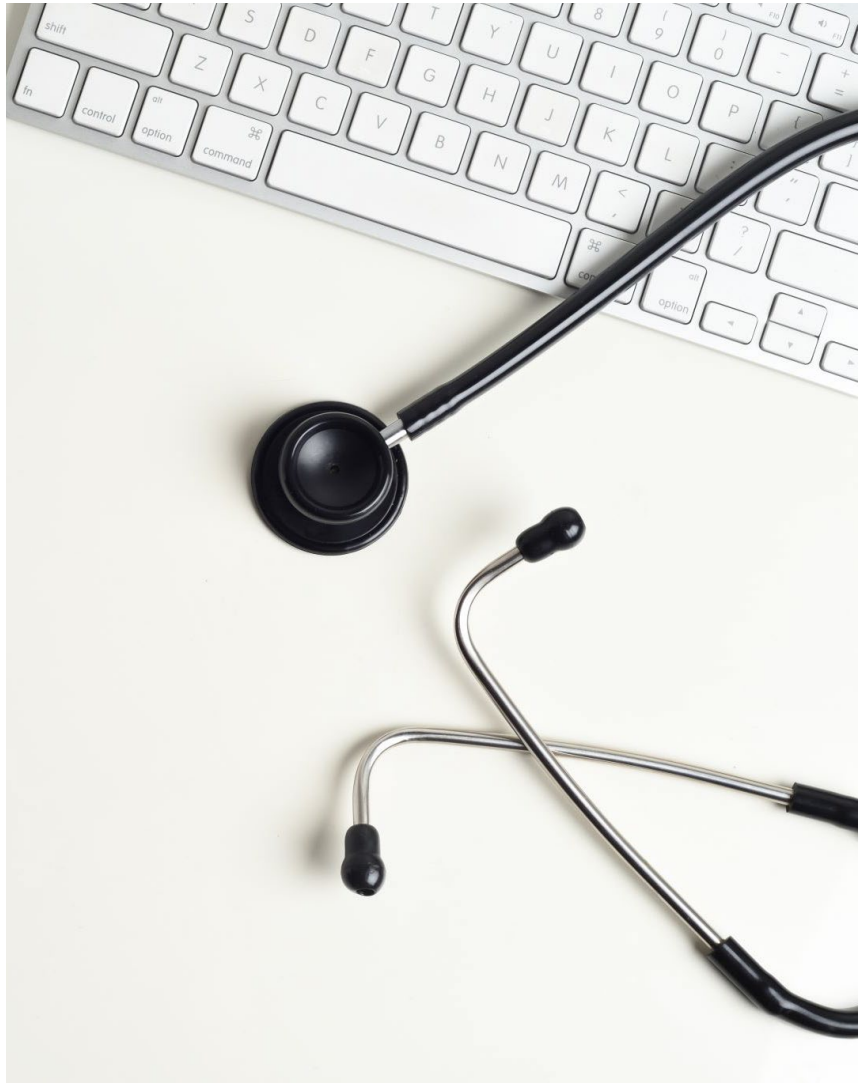


Image courtesy of Dr. Carolyn Lemsky

Pattern o


Marcus Institute for Brain Health
THE UNIVERSITY OF NEW MEXICO
Regional Vulnerability to TBI and Brain-Behavior Relationships
Anterior superior medial prefrontal cortex (anterior cingulate)
(initation/motivation, sustained attention, error detection)
Dorsolateral prefrontal cortex
(executive function, including sustained and complex attention, memory retrieval, abstraction, judgment, insight, problem solving)
White matter
(processing speed)
Orbitofrontal cortex
(emotional and social responding)
Temporal poles
(memory retrieval, semantics aspects of language, sensory-limbic integration)
Amygdala
(emotional learning and conditioning)
Ventral brainstem
(arousal, ascending modulatory neurotransmitter systems)
Entorhinal-hippocampal complex
(declarative memory, sensory gating, attention)
(Adapted from Arciniegas DB, Silver JM: Pharmacotherapy of Neuropsychiatric Disturbances. In Zasler ND, Katz DI, Zafonte RD, Arciniegas DB, Bullock MR, Kreutzer JS: Brain Injury Medicine, Second Edition. Demos Medical Publishing, New York, 2012, pp. 1227-1244. © 2021 David B. Arciniegas, MD. Used with permission.)



Traumatic Brain Injury: Chronic Condition

- Having a brain injury increases the risk for other medical problems
  - Seizure disorders
  - Endocrine disorders
  - Chronic pain
- Increases risk for behavioural health difficulties
- Closely associated with reduced access to social determinants of health

Populations most at risk for brain injury

Substance Users

Military

Domestic Abuse Survivors

Athletes (boxers, football players hockey players)

People with a previous TBI

Homeless/marginally housed

Marginalized and remote populations

Hotel study, Vancouver BC.

Characterizing Traumatic Brain Injury and Its Association with Losing Stable Housing in a Community-based Sample

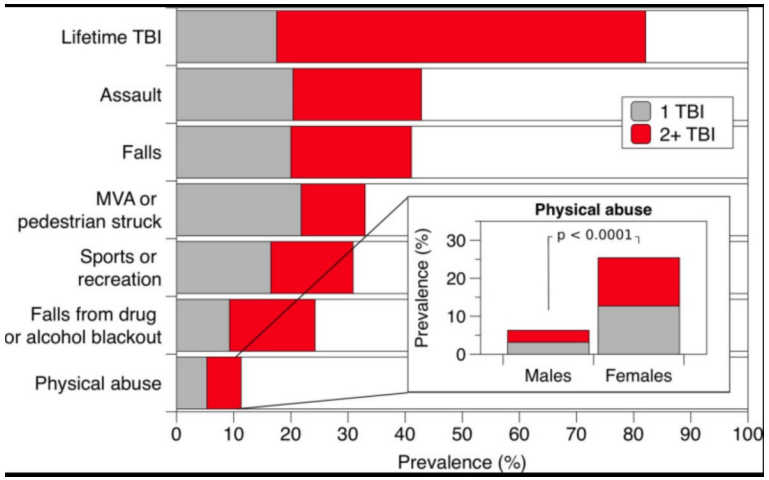
Jacob L Stubbs [1 2], Allen E Thornton [2 3], Kristina M Gicas [1 2 4], Tiffany A O'Connor [2 3], Emily M Livingston [2 3], Henri Y Lu [2 3], Amiti K Mehta [1 2], Donna J Lang [2 5], Alexandra T Vertinsky [5], Thalia S Field [6], Manraj K Heran [5], Olga Leonova [1], Charanveer S Sahota [3], Tari Buchanan [1 2], Alasdair M Barr [2 7], G William MacEwan [1], Alexander Rauscher [8], William G Honer [1 2], William J Panenka [1 2 9]

Affiliations + expand

PMID: 33719613 PMCID: PMC8935598 DOI: 10.1177/07067437211000665

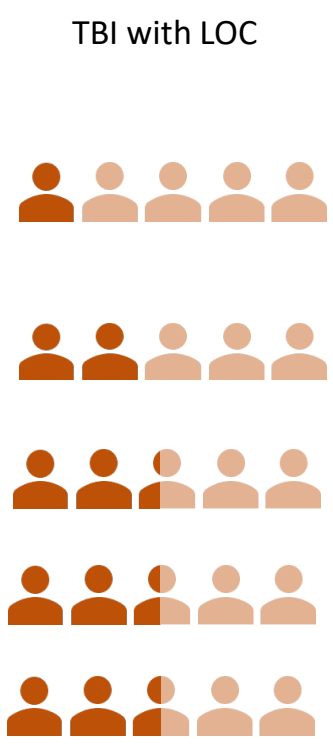
Participants: 285 precariously housed people.

- TBI in 82.1%; 21.4% moderate to severe
- Females reported more brain injuries
- First Mod/Severe injury occurred closer to onset of homelessness
- TBIs that occurred at onset of homelessness were associated with long-term homelessness



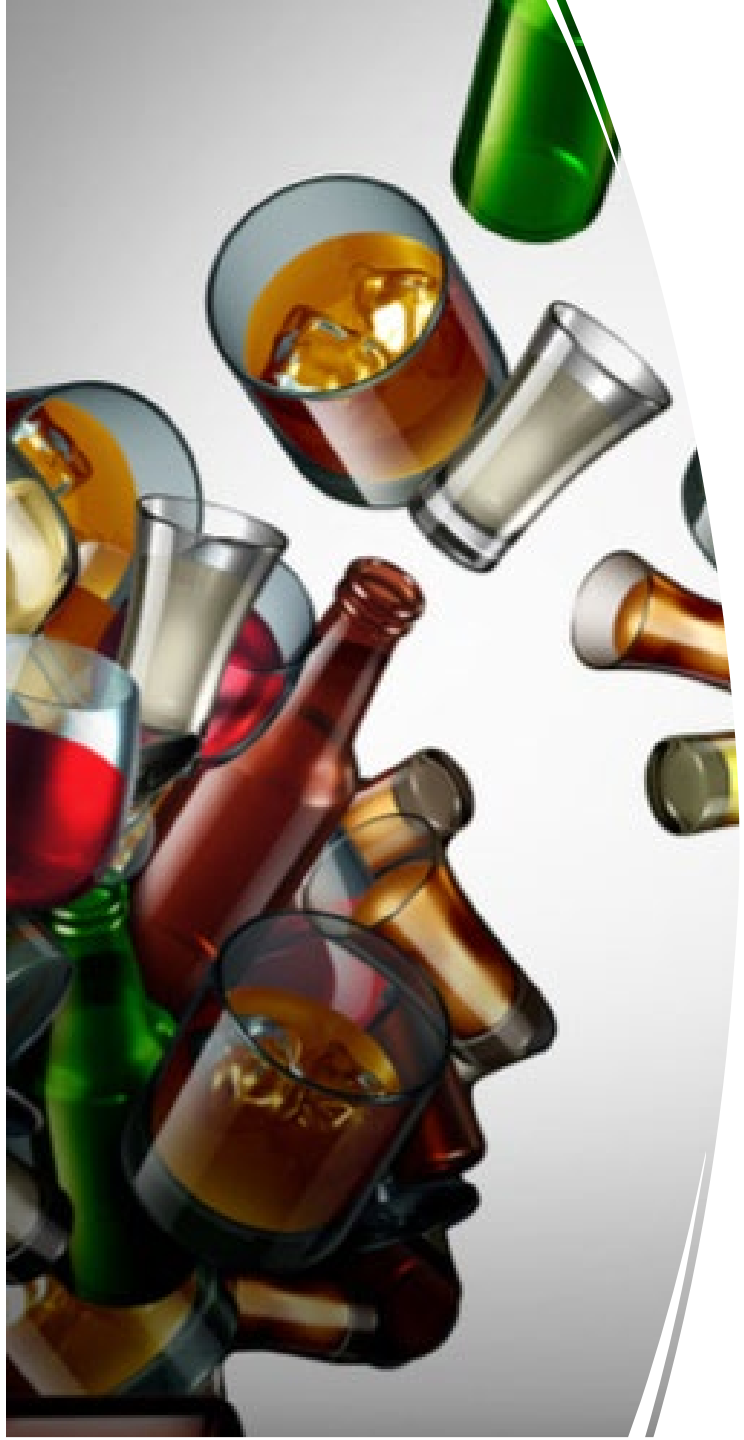
A history of TBI with LOC is common among the clients you serve

Lifetime History of TBI:	Any TBI	TBI with LOC	Mod/Sev TBI
General population of adults (*2-state; **3-state average)	33%*	22%**	5%**
SUD treatment (*Corrigan & Bogner; **Felde et al.)	65%*	40%**	17%*
Psychiatric inpatients (Burg et al.)	66%	43%	19%
Prisoners (*Shiroma et al; **Bogner & Corrigan)	60%*	50%*	14%**
Homeless (*Stubbs et al.; **Bremner et al., Solliday-McRoy et al.)	53%*	47%**	25%*



Concurrent SUD and Severe Mental Illness [N=295] (McHugo et al., 2015)

- 80% at least 1 TBI; 61% at least 1 TBI with LOC; 24% at least 1 mod/sev TBI
- Extent of TBI history associated with worse alcohol use, worse psychiatric symptomology, more arrests, greater homelessness
- TBI history associated with greater likelihood of PTSD and anti-social and borderline personality disorders.
- Earlier age at 1st TBI with LOC associated with presence of psychotic spectrum disorders

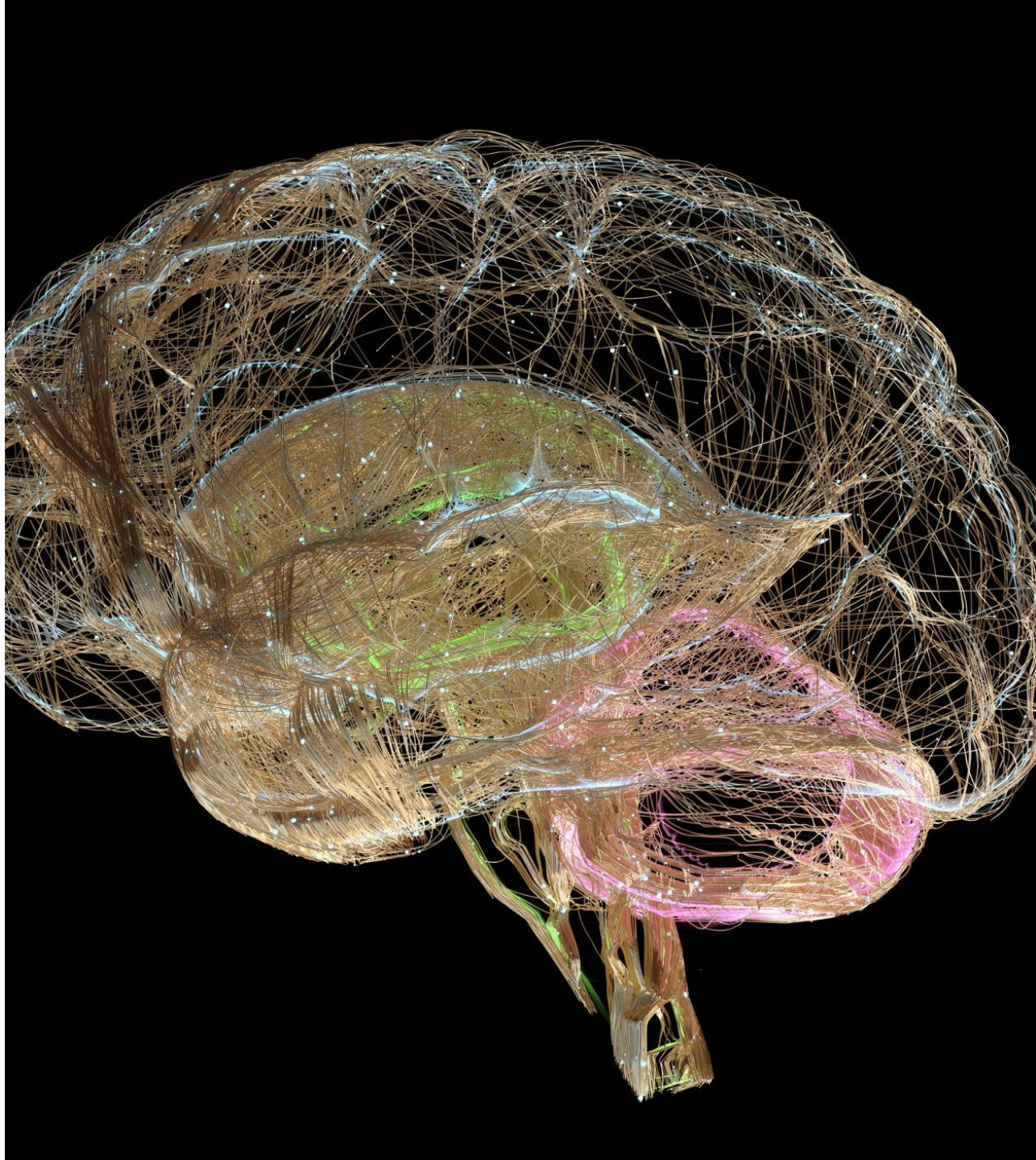


Why is there such a strong relationship between brain injury and substance use disorders?

- Intoxication increases the risk of having a brain injury.
- Each fall or overdose increases the likelihood of lingering cognitive impairment.
- The nature of brain injury and its outcomes
  - Impulsivity/Executive functioning
  - Poor Mental Health
  - Social isolation
  - Unemployment
- The results of brain injury may make it more difficult to benefit from treatment.

Other Sources of Cognitive Impairment

- Acquired Brain injury
  - Stroke
  - Anoxia
  - Toxic Injury
  - Tumors
  - Infection
  - Toxic Injuries
- Degenerative Neurological Diseases



Estimate 1: 15 Fatal to Non-Fatal Overdoses

▸ Inj Prev. 2024 Jan 30;30(2):114–124. doi: 10.1136/ip-2023-045091

Estimating the ratio of fatal to non-fatal overdoses involving all drugs, all opioids, synthetic opioids, heroin or stimulants, USA, 2010–2020

Shannon M Casillas [1,✉], Cassandra M Pickens [1], Lauren J Tanz [1], Alana M Vivolo-Kantor [1]

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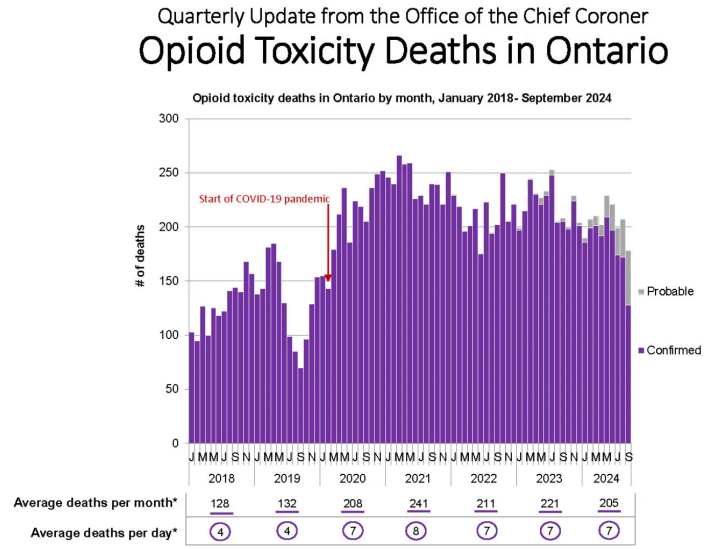
PMCID: PMC10958315 PMID: 38290778



1 in 5 people who died from substance-related toxicities had been treated in hospital for a non-fatal overdose in the year prior to death, the majority of which were related to opioid-related toxicity events. Public Health Ontario, 2025

Drug and Alcohol Dependence 247 (2023) 109865

Contents lists available at ScienceDirect

Drug and Alcohol Dependence

journal homepage: www.elsevier.com/locate/drugalcdep

A pilot study investigating cognitive impairment associated with opioid overdose

James J. Mahoney III [a,b,*], Erin L. Winstanley [a,b], Felipe Castillo [c,d], Rachel Luba [c,d], Jennifer Marton [a,b], Daniel M. Alschuler [d], Ying Liu [c,d], Sandra D. Comer [c,d]

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[b] Department of Neuroscience, Rockefeller Neuroscience Institute, West Virginia University, Morgantown, WV, USA
[c] Department of Psychiatry, Columbia University, New York, NY, USA
[d] New York State Psychiatric Institute, New York, NY, USA

OD may contribute to Cognitive impairment.

Between group differences (OD past year/No OD difference were statistically significant but small).

Changes related to pre-morbid abilities, number of ODs and health.

Cognitive Impact of substance use

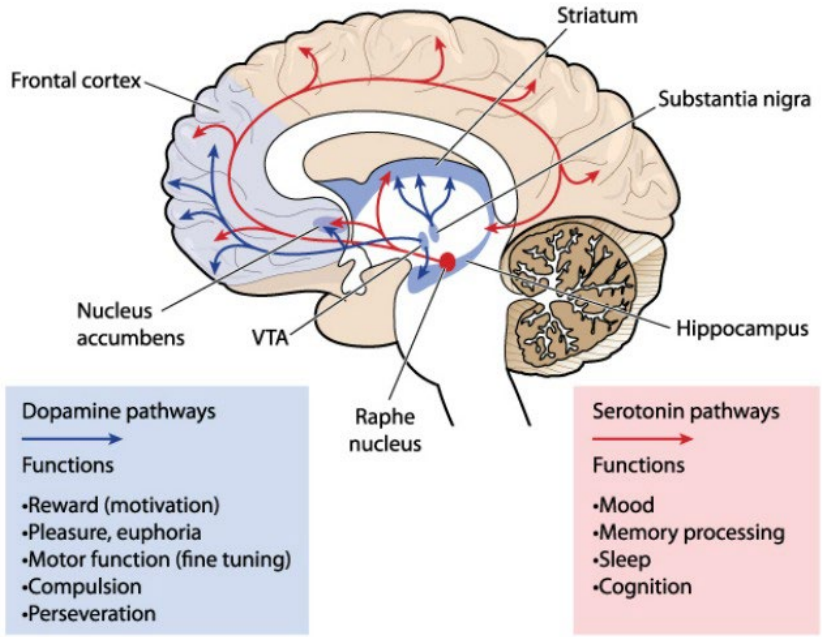
- Direct Toxic Effects
  - Attention
  - Memory
  - Executive functioning
    - Reasoning, problem-solving and risk recognition and emotional regulation
- Secondary effects
  - Overdose and Hypoxia
  - Secondary impact of other health disorders

Impact of Damage to pre-frontal cortex and reward system

Effects of hypoxia and opioid use

- Opioid use limits the growth of connections in the hippocampus.
- Changes how pleasure and reward are perceived.
- Damage to frontal lobes where information about emotion is processed and planning and problem-solving take place.

Neuroanatomy of Reward



Brain functions that may be affected by brain injury and substance use

Cognitive

Attention

Cognitive Processing (speed)

Learning new information

Remembering new information

Reasoning

Problem-solving

Behavioural

Mood

Emotional Regulation (irritability, lability, flooding)

Impulse control

Communication

Processing auditory information

Understanding auditory information

Verbal expression (organizing ideas and finding words)

Reading and Writing

Social Communication

Theory of mind

Recognizing social cues

Responding to social cues

Empathy

Clinical Observations

An even bigger gap between what a client intends to do and what they are able to do

More likely to have difficulty engaging in treatment and leaving treatment early

- Finding services
- Making and keeping appointments
- Keeping up with program requirements

More likely to be seen as non-compliant or unmotivated

Assume that your client is doing the best that they can.

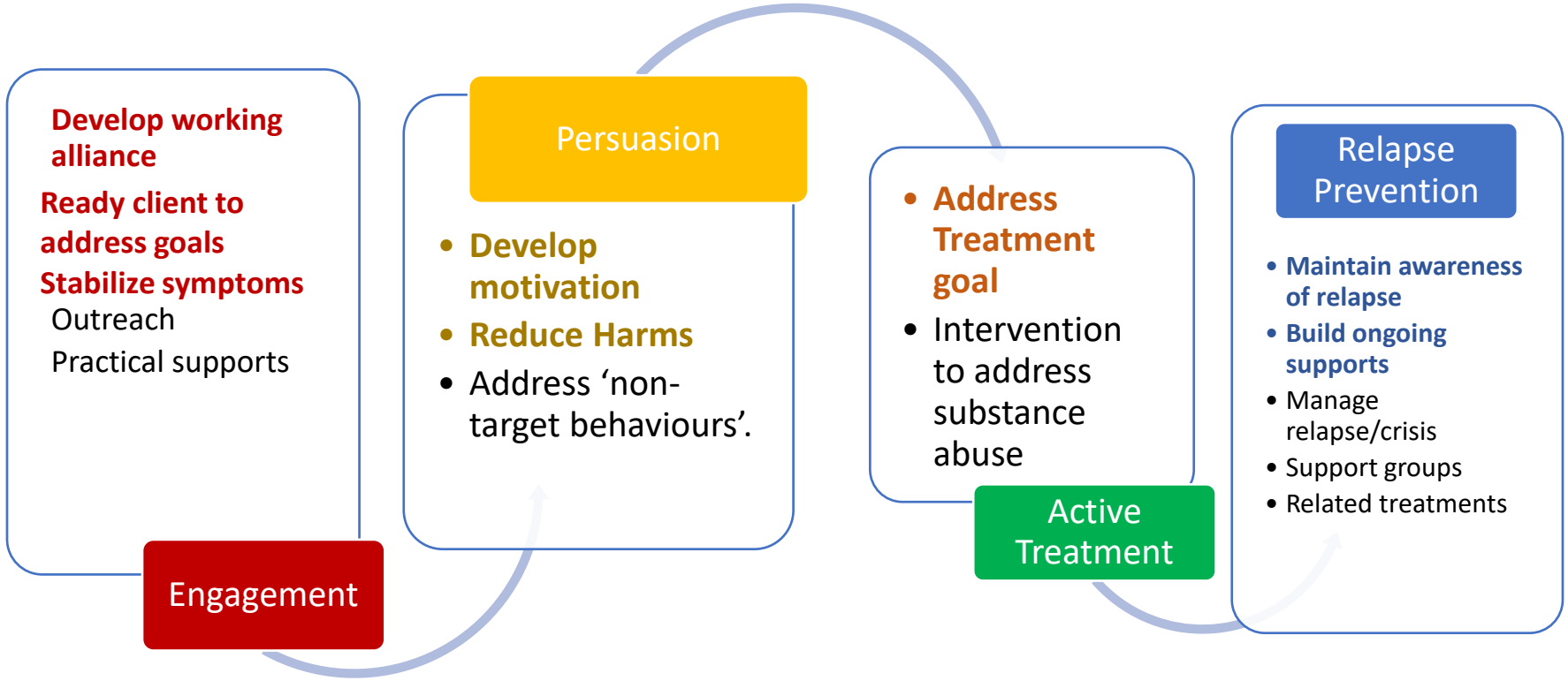
What are the possible barriers to success?

To avoid misattributing a cognitive problem to a lack of motivation ask yourself…

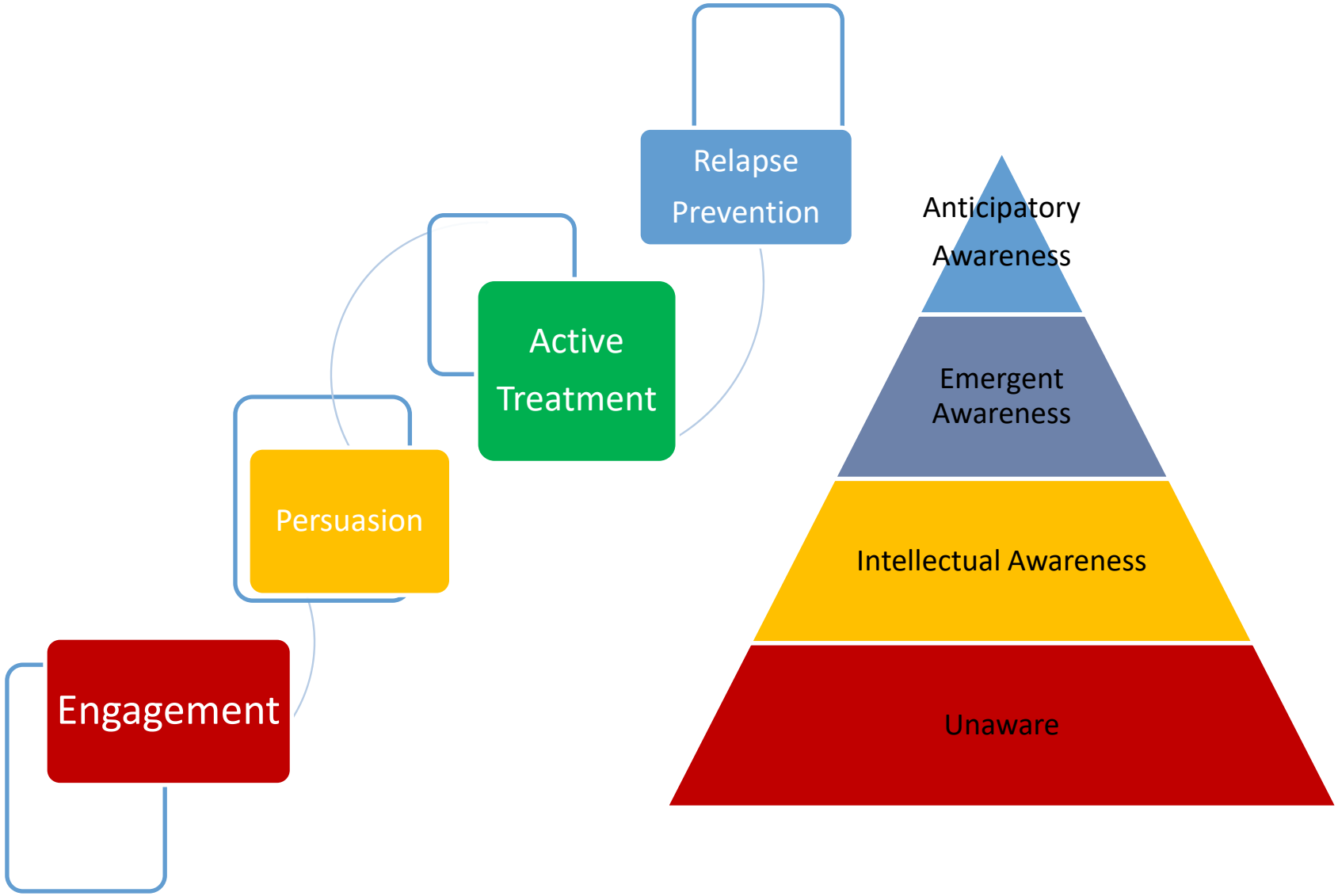
1. Could this be related to a neurological problem?

2. What can I do to accommodate?

Phases of concurrent treatment (case management model)



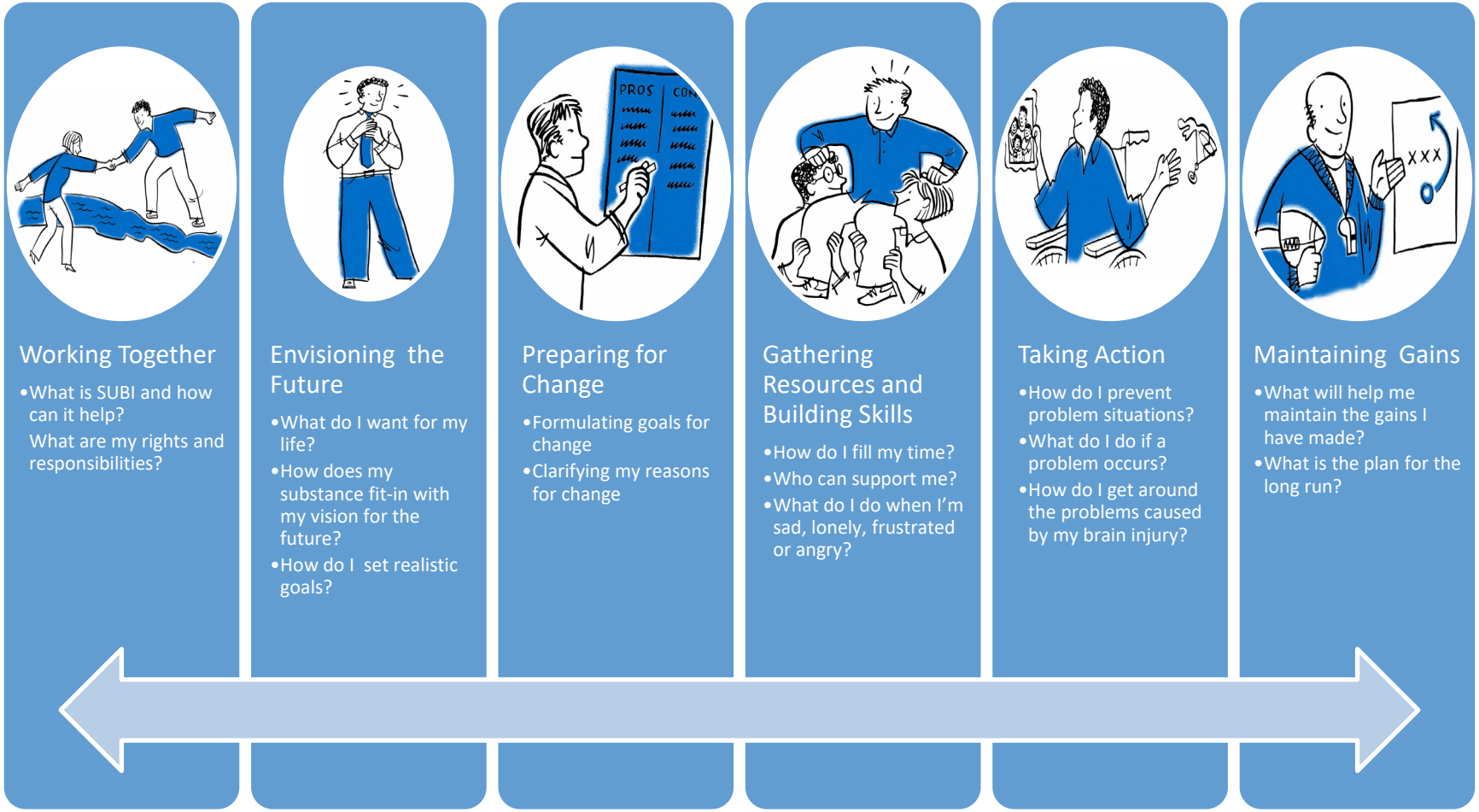
When the intervention requires action on the part of the client….



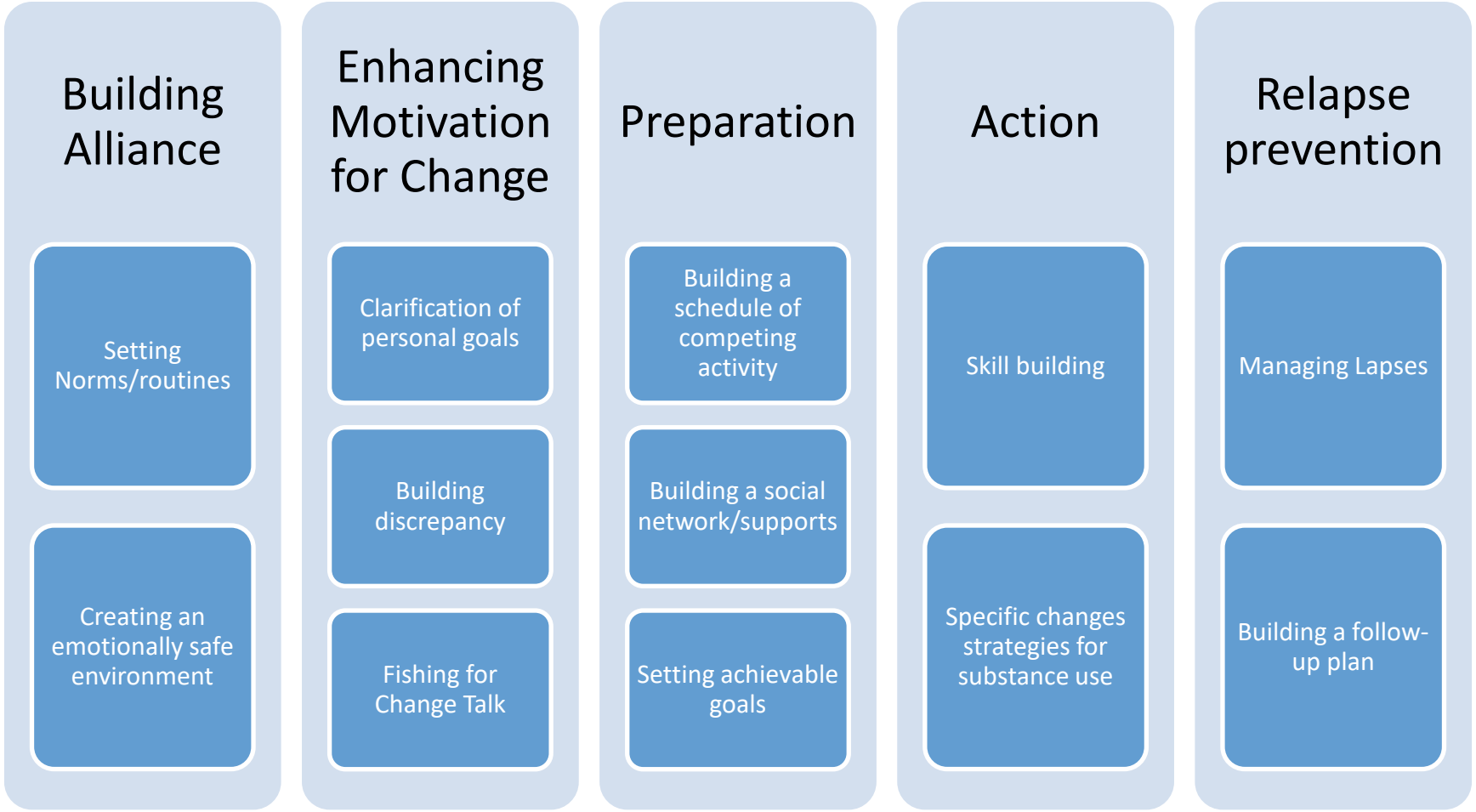
Concurrent treatment

Phase of treatment	Stage of Change	Level of Awareness
Engagement Build rapport	Pre-contemplation	No Awareness
Persuasion Build motivation	Contemplation	Intellectual Awareness
Active treatment Build intervention	Action	Emergent Awareness
Relapse prevention Build safety net	Maintenance	Anticipatory Awareness

Each phase of the intervention will try to help you to answer different questions.



Model of Intervention
For the facilitator



A lower cognitive load will be appreciated by everyone you serve.

Good communication is essential for engagement.

Communication relies on good cognition.

Accommodating cognitive impairment

Showing up

Paying attention

Remembering What to do

Deciding what to do

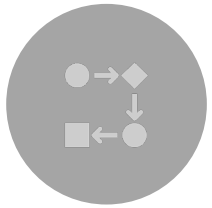
Planning

Starting

Evaluating

Reducing cognitive load

Slow down



Break down tasks

Use routines

Create reminders and teach clients to use them

Set clear goals and agendas

Remove Distractions

Good

- Ensure good communication
- Address barriers to engagement
- Universal cognitive compensation

Better

- Screen for History of TBI
- Training to recognize cognitive impairments
- Reduce the cognitive load of your intervention

Even Better

- Reduce barriers to service
- Develop relationships with other community providers
- Consider the use of adapted materials where possible

Best

- Screen for cognitive impairment
- Consider modifying existing programming.
  - Case management supports/engaging environmental supports
  - Psychoeducational programming related to cognitive impairments
  - Smaller groups/more individual work
  - Extended programming

General Principles for Cognitive Compensation

Simple and direct

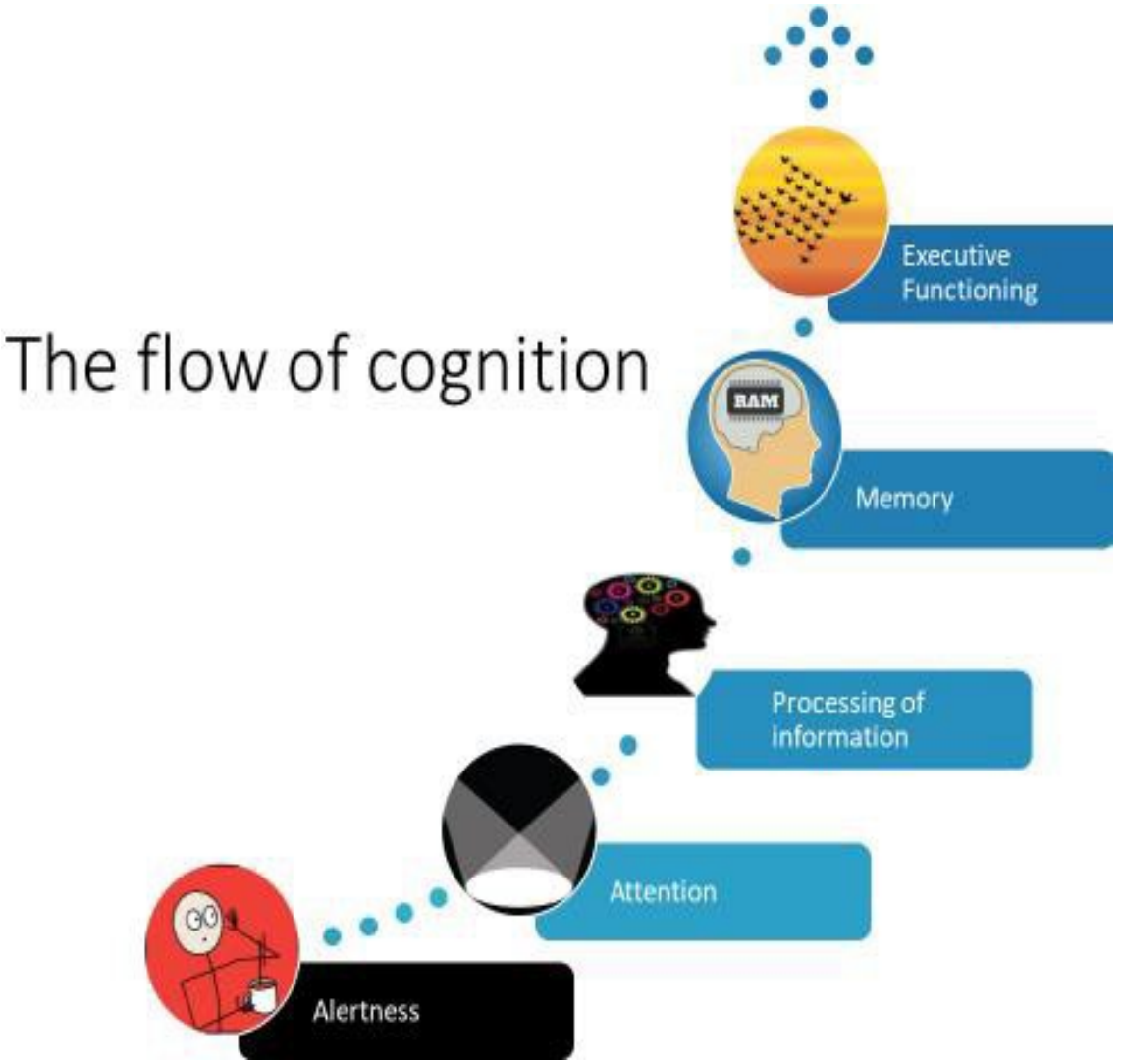
Use Routines

Be Collaborative

Support attention and comprehension

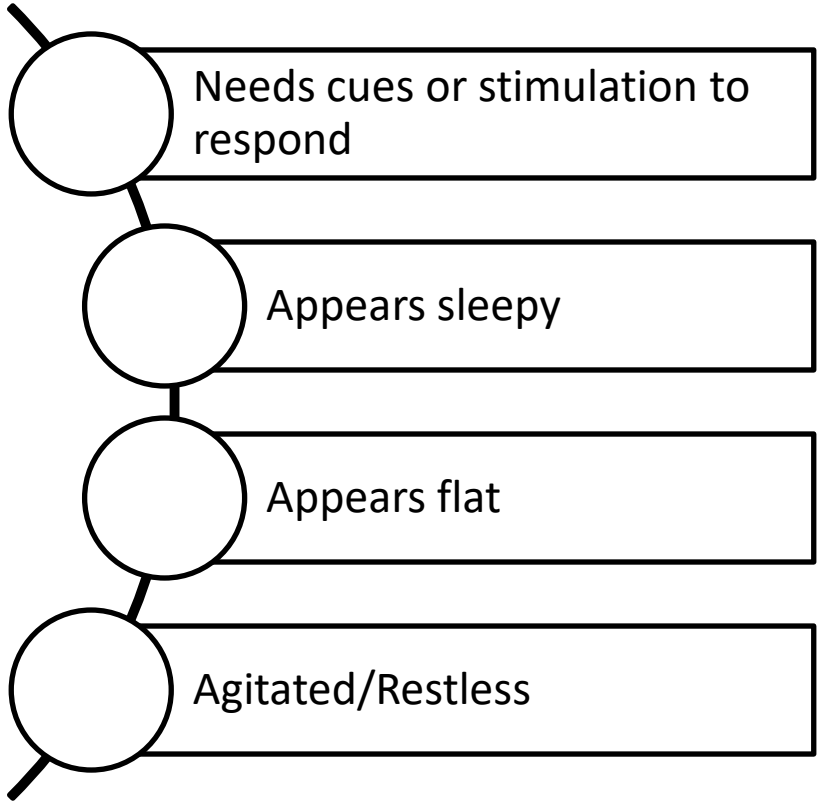
Support learning and memory

- Alertness
  - Timing of appointments
  - Allowing breaks and movement
  - Modifying schedules
- Attention
  - Removing distractions
  - Visual aids
- Processing of information
  - Slow down
  - Elicit
- Memory
  - Summarize frequently
  - Provide written information
  - Strategize with the client about using memory aids
    - Passwords
    - Texts/messages
    - Background on phone screens.

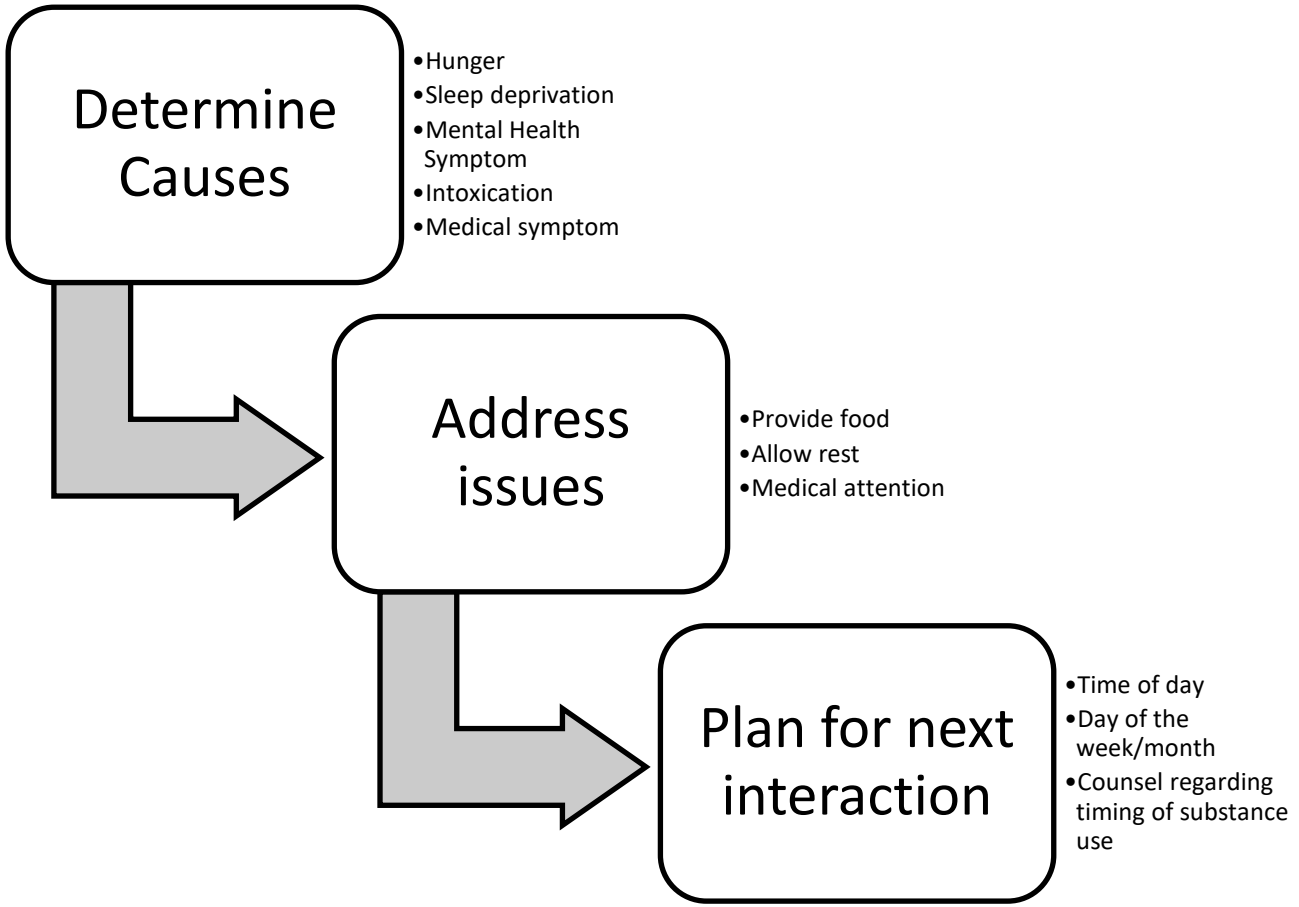


Ability to respond to the environment.

What you see


Needs cues or stimulation to respond
Appears sleepy
Appears flat
Agitated/Restless

What to do


Determine Causes
•Hunger
•Sleep deprivation
•Mental Health Symptom
•Intoxication
•Medical symptom
Address issues
•Provide food
•Allow rest
•Medical attention
Plan for next interaction
•Time of day
•Day of the week/month
•Counsel regarding timing of substance use

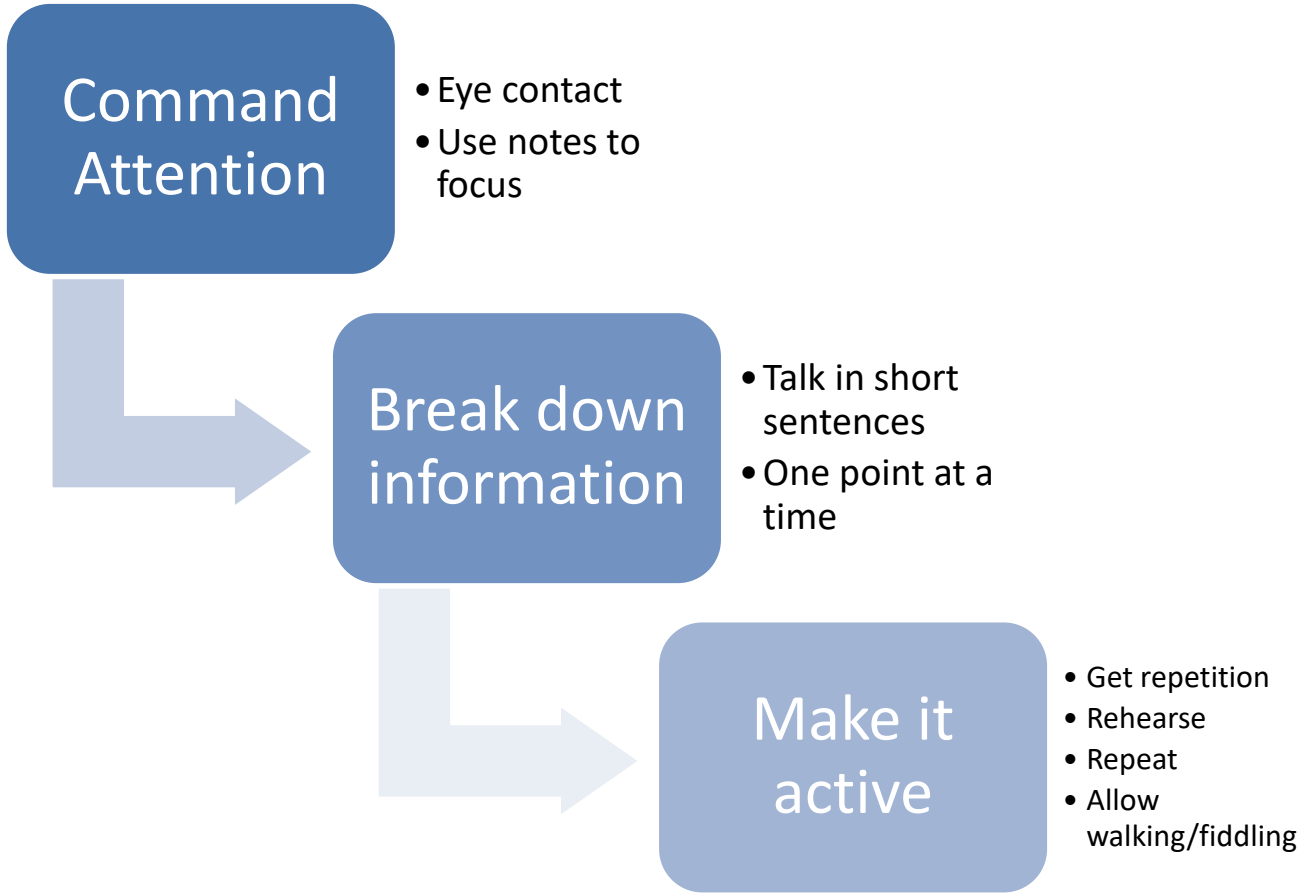
- Focusing attention
- Sustaining attention
- Alternating attention

Attention

Problems with Attention

- Trouble staying tuned-in
- Seeks stimulation
- Looks bored
- Restlessness/fidgeting

What to do


Command Attention
• Eye contact
• Use notes to focus
Break down information
• Talk in short sentences
• One point at a time
Make it active
• Get repetition
• Rehearse
• Repeat
• Allow walking/fiddling

Other things to do…

- Remove distractions
- Talk in short sentences (not paragraphs)
- Repeat information
- Make Notes
- Check comprehension
- Make stressors predictable (if they can’t be avoided).
- Rehearse responses
- Ask clients how they will remember future events

Processing of information

Speed and accuracy of information processing.

Problems with Processing Information

- Only hears part of a message
- Seems to get tired easily
- Seems very passive
- Looses attention (spaces out)

What you can do

Slow it down.

- Pause
- Write notes while you speak

Simplify

- One idea at a time

Check-in

- Ask for a repetition

Declarative memory

- Memory for events
- Memory for facts
- Biographical Information

Procedural memory

- Habits and routines

Memory for Faces

Affective (emotional) memory

Problems with Memory

- Inconsistent in activities
- Trouble recalling events
- Difficulty Learning
- Lack of follow-through
- Seems to make things up

Memory

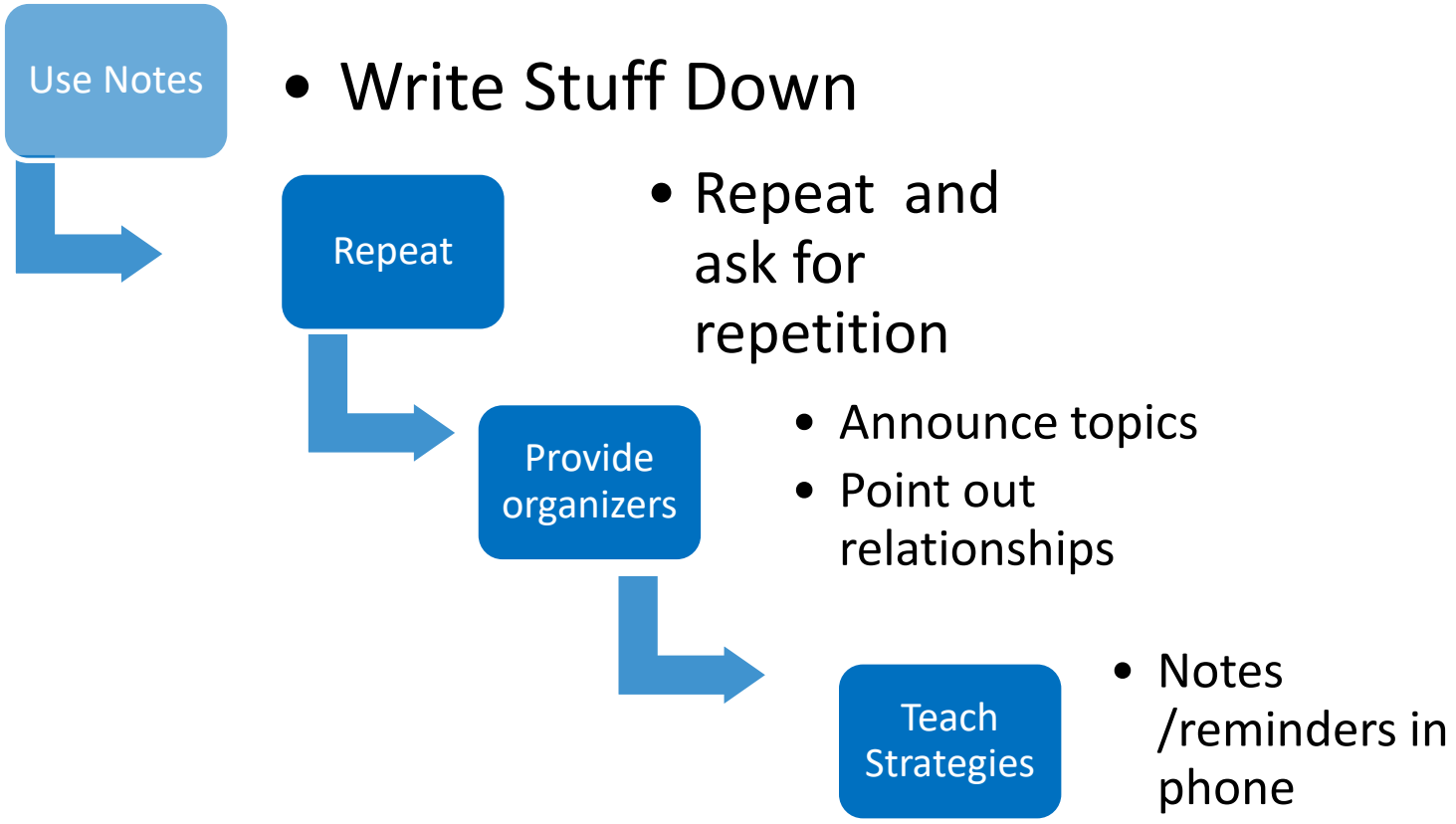
Most often impaired

- Learning new information
- Recalling new information without cues
- Remembering to do things in the future
- Memory for context (source memory)
- Memory of episodes after injury

Often show less impairment

- Memory for faces
- Recognition (cued) memory
- Procedural learning (learning by habit/routine)
- Biographical information (pre injury)

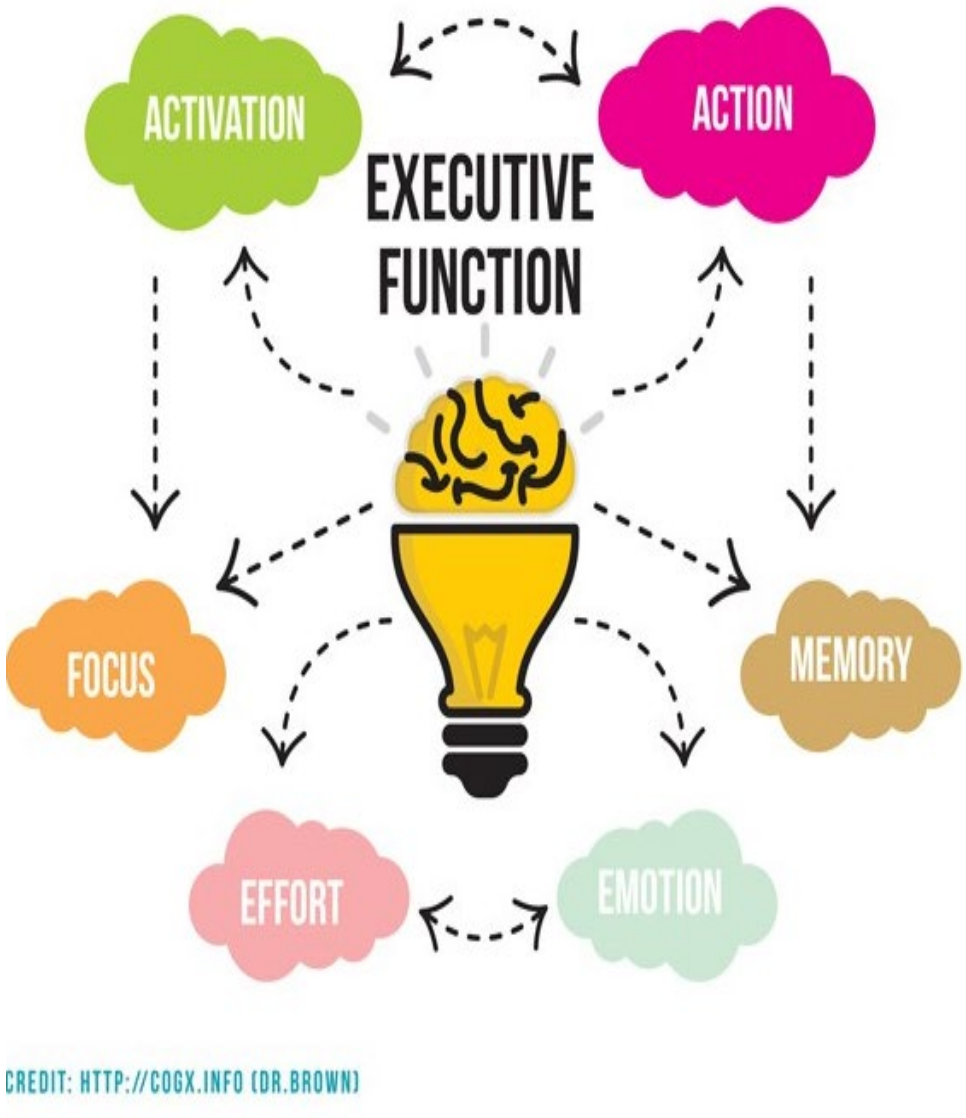
What you can do



Affect will be remembered far better than content!

Makes it necessary to monitor affect and try to balance the content of sessions, ending on a positive note.

Executive Functioning



ORGANIZE, PRIORITIZE, ACTIVATE WORK

MONITOR AND SELF-REGULATE ACTIONS

UTILIZE WORKING MEMORY & SHORT TERM RECALL

MANAGE FRUSTRATIONS AND MODULATE EMOTIONS

REGULATE ALERTNESS, SUSTAIN EFFORT AND SPEED

FOCUS, SUSTAIN AND ABILITY TO SHIFT TASK ATTENTION

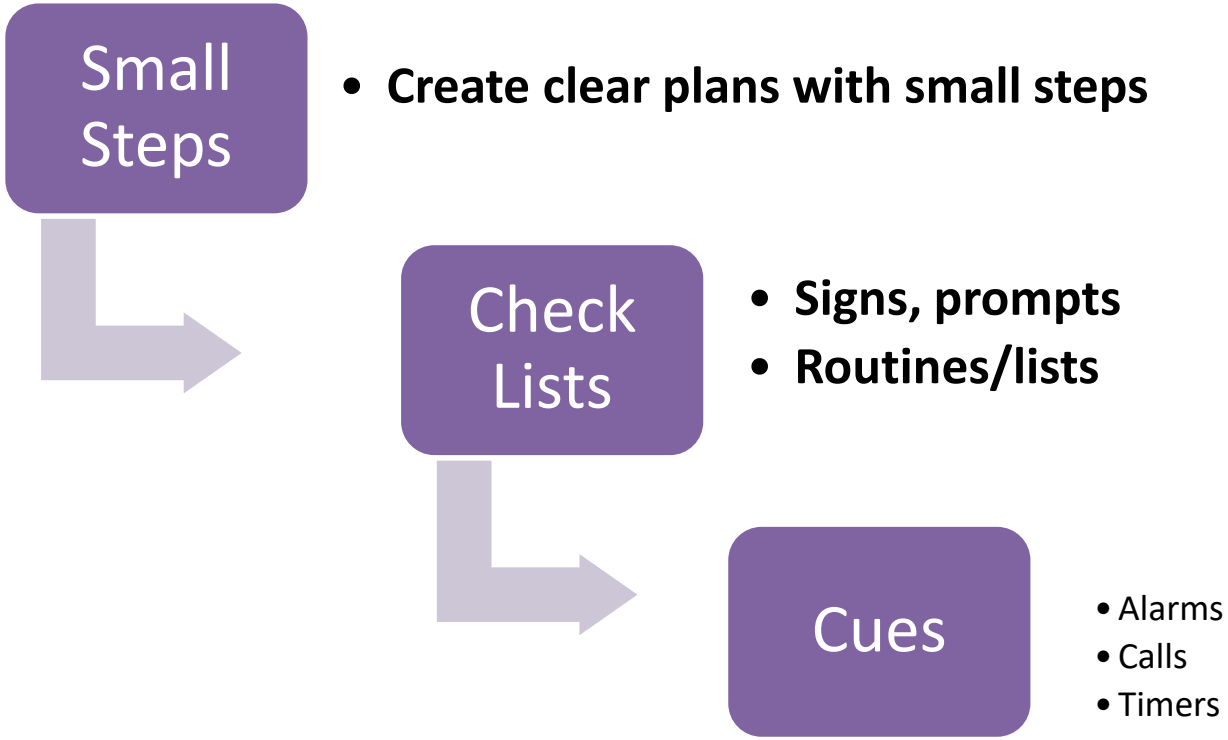
Executive Function

- Planning
- Mental Control
  - Initiating activity
  - Switching tasks
- Emotional Control
- Self Awareness
- Behavioural Self-management

Problems with Planning and Initiation

- Appears unmotivated
- Identifies goals, but doesn’t act
- Needs constant reminders to complete a task
- Others describe as ‘lazy’

How to help


Small Steps
• Create clear plans with small steps
Check Lists
• Signs, prompts
• Routines/lists
Cues
• Alarms
• Calls
• Timers

Problems with Processing Emotion

- Insensitive to social cues
- Seems to lack empathy or be self-centered
- Trouble reading others' intentions
- Short fuse
- Flat affect
- Labile affect

Emotional Regulation

Reading others' emotion

Emotional reactivity

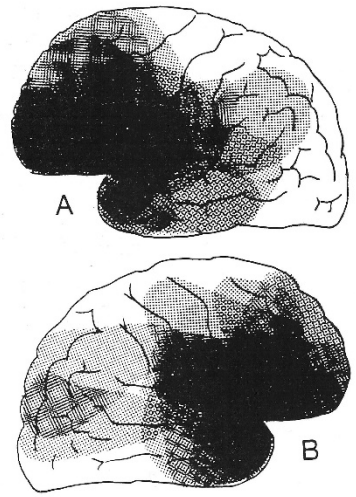
Lability

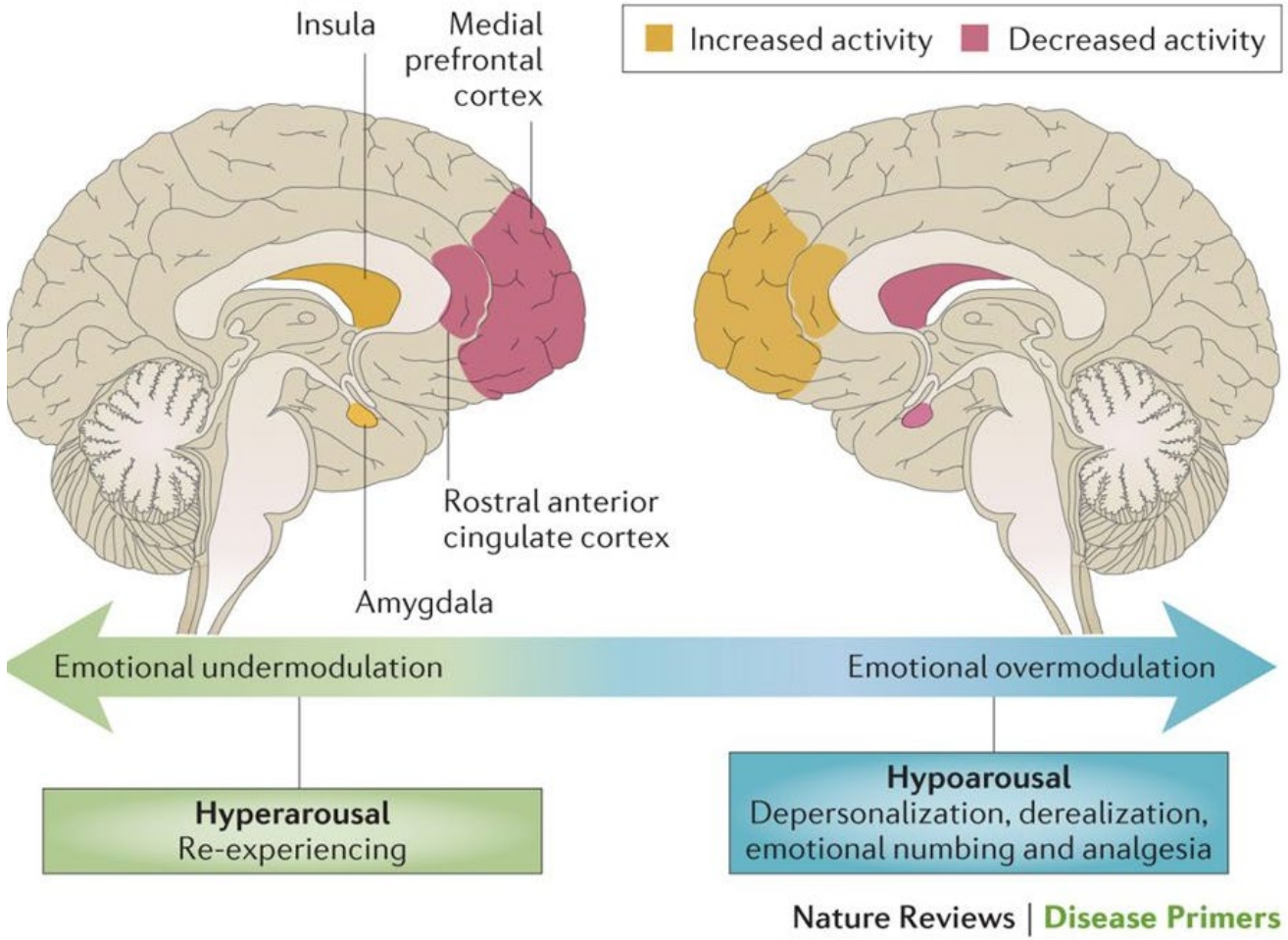
Anger management

Recognizing one's own emotional state

Emotional Regulation in PTSD

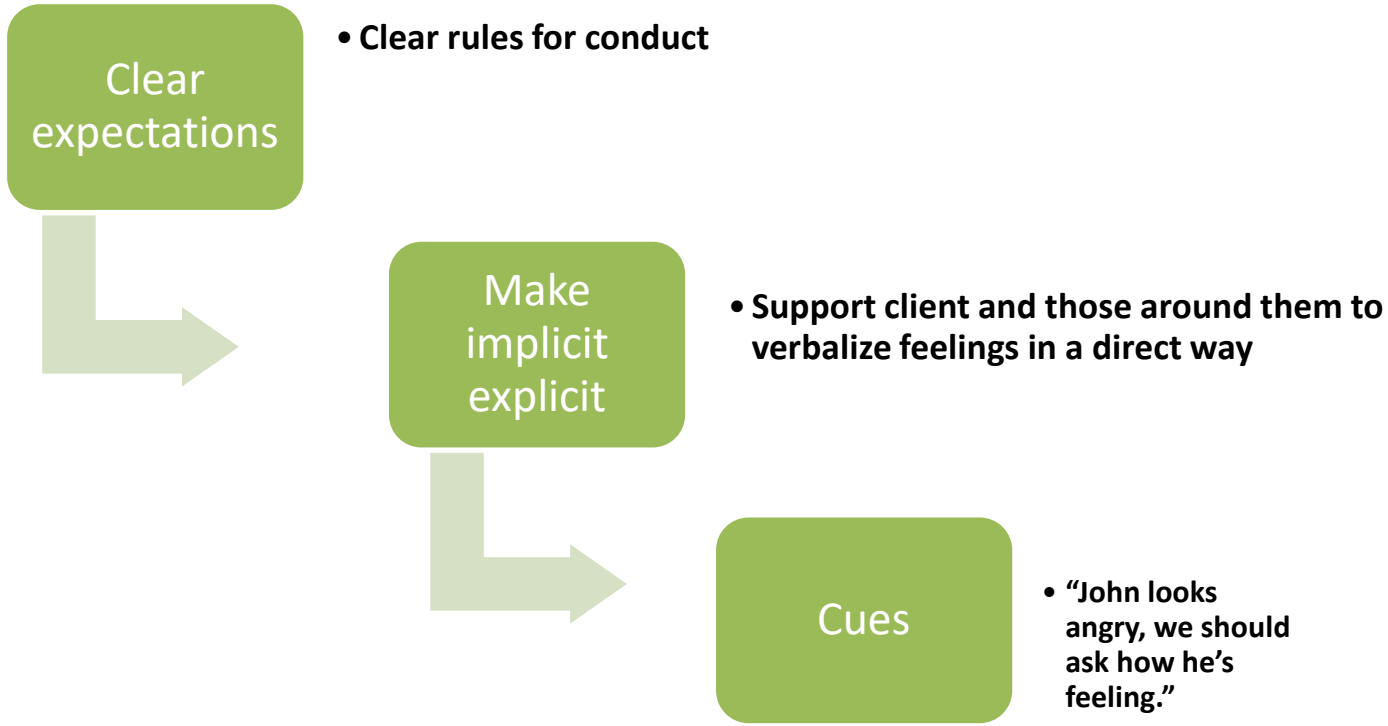
Pattern of Traumatic Injury





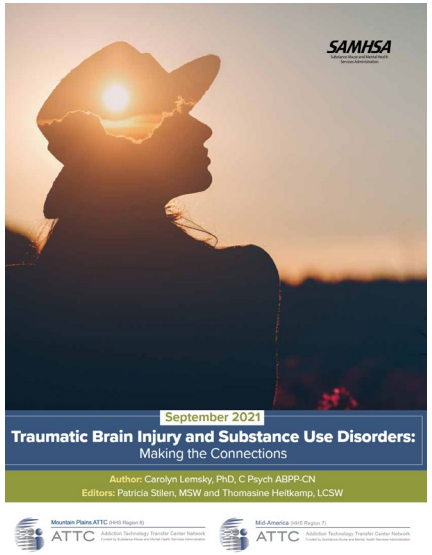
Joy
Anger
Surprise
Disgust
Contempt
Fear
Sadness

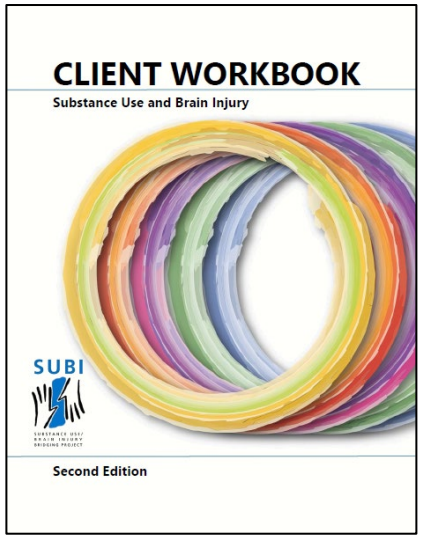
How to help


Clear expectations
• Clear rules for conduct
Make implicit explicit
• Support client and those around them to verbalize feelings in a direct way
Cues
• "John looks angry, we should ask how he's feeling."

Supporting the development of integrated programing

- Raising awareness
- Screening
- Teach providers what they can do
- Materials to facilitate productive partnerships





RESOURCES

What is a Provincial ABI Navigator

Created as a Provincial resource in 2010 to provide a navigational link between the healthcare system and the individual with an acquired brain injury (ABI) in an effort to:

1. Promote and improve system access and capacity
2. Improve Outcomes
3. Improve the individual's overall experience

What is a Provincial ABI Navigator

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1. Promote and improve system access and capacity
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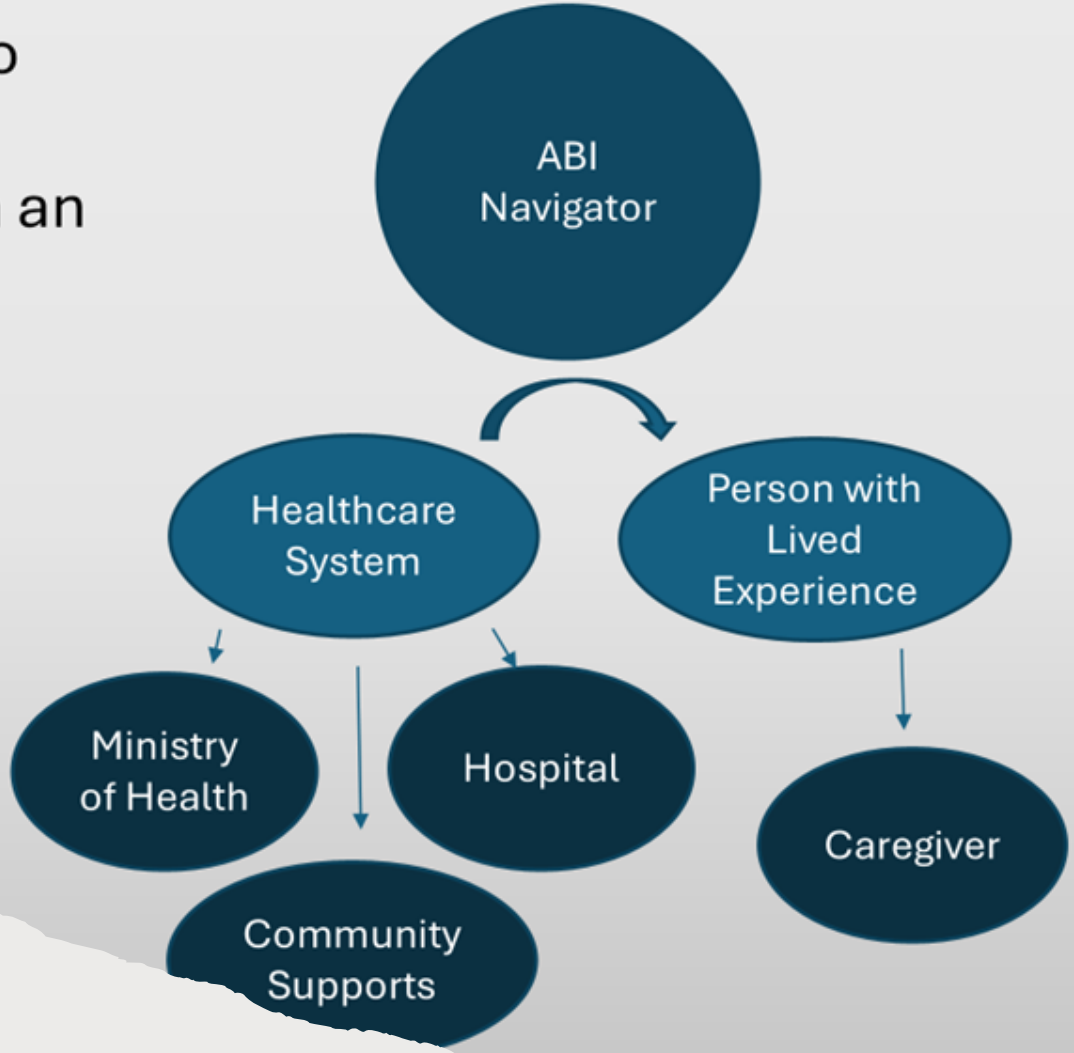


ABI NAVIGATORS CONTACT INFORMATION

Legacy LHIN	Geographic Region	Contact Details
1	Erie St. Clair	ABI and Exceptional Supports Manager Assisted Living Southwestern Ontario 1100 University Ave. W. Windsor, ON N9A 5S7 (519) 969-8188 ext 343
2	South West	Regional ABI System Navigator St. Joseph's Health Care London Parkwood Institute Main Building Acquired Brain Injury Program P. O. Box 5777, Station B London ON N6A 4V2 (519) 685-4292 ext 42988
3	Waterloo Wellington	ABI Intensive Care Coordinator & System Navigator Traverse Independence 1-1382 Weber St E, Unit 1 Kitchener, ON N2A 1C4 (519) 741-5845 Direct: (519) 580-9206
4	Hamilton Niagara Haldimand Brant	HNHB ABI Service & System Navigator HNHB ABI Network 225 King William St. Suite 508 Hamilton, ON L8R 1B1 (905) 523-8852
5	Central West	Clinical Services Manager & System Navigator Mind Forward 176 Robert Speck Pkwy Mississauga, ON L4Z 3G1 (905) 949-4411 x240
6	Mississauga Halton	
7	Toronto Central	ABI Referral Coordinator & System Navigator Toronto ABI Network 550 University Ave. Rm 3-102-11 Toronto, ON M5G 2A2 (416) 340-4800 x8660
8	Central	ABI System Navigator Central ABI Collaborative 62 Finch Ave. W. Toronto, ON M29 7G1 (416) 240-8000 x755
9	Central East	CE ABI System Navigator Brain Injury Association of Peterborough 158 Charlotte Street Peterborough, ON K9J 2T8 (705) 741-1172 Toll Free: 1(800)854-9738 Direct: (705) 875-7839
10	South East	SEO ABI System Navigator Community Brain Injury Services 401-303 Bagot St. Lasalle Mews Kingston, ON K7K 5W7 (613) 547-6969 x37165
11	Champlain	Champlain System Navigator for ABI Champlain – Ontario Health atHome 100 – 4200 Labelle St. Ottawa, ON K1J 1J8 (613) 310-2222 x5963 Toll Free: 1-800-538-0520 x5963 Direct: (613) 292-8681
12	North Simcoe Muskoka	North Simcoe Muskoka ABI System Nav North Simcoe Muskoka ABI Collaborativ 21 Essa Rd. Unit 1 Barrie, ON L4N 3K4 (705) 734-2178 x.228 Toll Free: 1-877-320-1950
13	North East	Regional ABI System Navigator March of Dimes Canada 96 Larch St. Unit 400 Sudbury, ON P3E 1C1 (705) 671-3188
14	North West	Intake Coordinator & ABI System Naviga Brain Injury Services of Northern Ontari 426 Balmoral St. Thunder Bay, ON P78 5G8

https://abinetwork.ca/for-professionals/abi-navigators/

THE CENTRAL LINK ABI Resource Library

THE CENTRAL LINK
ABI RESOURCE LIBRARY

THE CENTRAL LINK is a wide-ranging collection of Central Region, Provincial and Federal resources that can facilitate navigation to funded support services for persons with an acquired brain injury (ABI), caregivers and support professionals.

www.neurotraumapathways.ca/central-link

FIND RESOURCES IN THE AREAS OF:

- ABI Supports & Services
- Community Supports & Social Services
- Specialized Supports & Services
- Accessibility
- Healthcare

Reintegrating into the community after a brain injury involves more than just ABI focused support. It may include the need to explore resources related to income, accessible transit, or supports related to mental health.

THE CENTRAL LINK serv
a comprehensive resource h
help you and those who supp
you, find the links you need t
regain your footing after an A
Visit the link below to find ou
more.

www.neurotraumapathways.ca/central-lin

This project was made possible through the Neurotrauma Care Pathways

Alcohol and Drug Cognitive Enhancement (ACE) program

Improving brain function for better alcohol and drug treatment outcomes

Research shows that approximately 50% of clients seeking treatment for alcohol or other drug use have cognitive impairment. This can make staying in and benefiting from treatment more challenging. The ACE program is a suite of tools and resources that provide a cognitive impairment intervention for people in alcohol and drug treatment settings.

All services working with clients seeking alcohol and drug treatment can:

- use the program screening and assessment tools to identify clients with cognitive impairment
- use the brief intervention and cognitive remediation program to respond to and support clients with cognitive impairment.

Screening and assessment

Cognitive remediation program

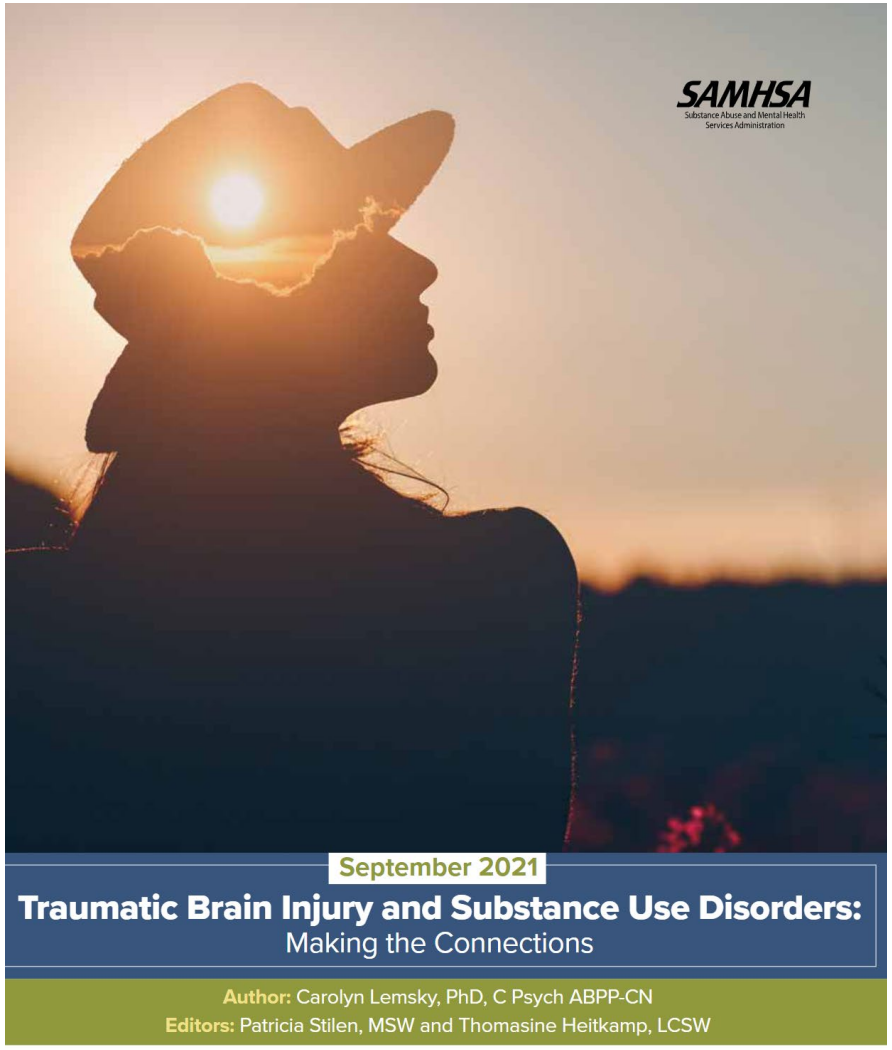
Brief intervention

Background

Contact

Alcohol and Other Drugs Network Manager

Email
ACI-AODNetwork@health.nsw.gov.au



https://attcnetwork.org/centers/mid-america-attc/traumatic-brain-injury-sud-series

TABLE OF CONTENTS

https://attcnetwork.org/centers/mid-america-attc/traumatic-brain-injury-sud-series

Patterns of Injury

The Fingerprint of TBIs

The pattern of TBIs is not random. Because of the anatomy of the skull and how most traumatic injuries occur, TBIs tend to have the greatest impact on the structures of the prefrontal cortex and the temporal lobes. The inside of the skull has bony structures designed to hold the brain in place. When the force is great enough, rubbing up against these structures can cause damage to the surface of the brain and can also result in axonal shearing. For these reasons, TBIs will tend to have a pattern of disconnection that has its greatest effect on the connections from the prefrontal cortex (executive functioning) and the limbic system (emotional centers) that make up the reward circuit. These are the brain structures that are responsible for focusing attention and regulating emotion and behavior; they mediate how a person responds to reward. When connections between these areas are working well, judgments about risks and rewards are experienced as a gut feeling about the right thing to do. Focusing on a conversation in a noisy room, reading others' non-verbal behavior, keeping a lid on strong emotion, or remembering the good feelings that come with a success are automatic when connections in the brain are working. When these connections are disrupted as the result of TBI, these essential functions require conscious effort and become inefficient.

The reward circuit relies heavily on dopamine as a neurotransmitter. It is the reward where most substances of abuse exert their effects. As discussed below, the ongoing use of some substances of abuse alters the functioning of the reward system, making people more sensitive to immediate reward and less sensitive to punishing events. This same pattern is often observed after a TBI and results in behavioral impulsivity.

Brain Injuries and Overdose

An overdose can cause a brain injury, and having one overdose puts a person at risk for more.[23] People who are living with cognitive impairment are more prone to overdoses. They may have more difficulty monitoring their intake of a drug. It is also possible that changes in brain function may cause some drugs to have a more powerful effect.[57]

In overdose, the leading cause of damage to the brain is loss of oxygen. When loss of oxygen occurs for longer than 5 to 6 minutes, changes in brain chemistry occur that result in the destruction of neurons. Because the structures responsible for memory (the hippocampus) and movement (the cerebellum) use a lot of oxygen, these structures are among the first to show damage. The longer the loss of consciousness, the more tissue may be damaged or destroyed. Frequent overdoses with limited time for the brain to recover may result in increased damage. The symptoms of anoxic brain injury commonly impact executive functioning, memory, and attention, as well as movement.

Toxic Effects of Substance Use

The impact of substance use depends on the substance used and the amount and duration of use. The age when substance use started is also an important factor. Starting substance use while the brain is developing can have long-term consequences. Although the findings from the research are complex and sometimes contradictory, the most common problems associated with substances of all kinds are difficulty, including problems with memory, attention, and executive functioning, including problem-solving, goal setting, and planning.

The table below provides a broad summary of the effects of common substances of abuse. Although more research is needed, it appears that the toxic effects of alcohol and other drugs are more dramatic in people who have had a history of brain injury.

SUBSTANCE	NEUROLOGICAL EFFECTS	COGNITIVE EFFECTS
ALCOHOL[12, 48]	• Associated with brain atrophy, particularly the Hippocampus (memory system). • Thiamine deficiency may cause a severe short-lived condition (Wernicke's encephalopathy) or result in lasting learning and memory problems (Korsakoff's syndrome).	Memory Executive Functioning: • Visual-Spatial abilities.
CANNABIS[50]	• Some evidence for atrophy in the Hippocampus (memory system) and changes in connectivity between the frontal lobes and limbic system. • May have a greater impact on the developing brain.	Memory Executive Functioning.
METHAMPHETAMINE[51, 52]	• Widespread damage to dopamine receptors, with cell loss in the emotion and reward system (limbic system), and Hippocampus (memory system).[56]	Memory Executive Functioning: • Inability to suppress habitual behaviors. • Sensitivity to short-term reward. • Insensitivity to punishment. • Insensitivity to normal pleasures.
COCAINE[53, 55]	• Weakened connections between the frontal lobe and limbic system (frontostriatal) connections, brain atrophy, and changes in limbic (emotional) and Hippocampus (memory system).	Memory Executive Functioning: • Sensitivity to short-term rewards. • Insensitivity to normal pleasures. • Increased sensitivity to pain.
OPIOIDS[56]	• Weakened connections between the frontal lobe and limbic system (frontostriatal) connections, brain atrophy, and changes in limbic (emotional) and Hippocampus (memory system).	Memory Executive Functioning: • Sensitivity to short-term rewards. • Insensitivity to normal pleasures. • Increased sensitivity to pain.

Problems with Processing Information

Processing information relies on good connections among brain structures. After brain injury, pathways between the brain's processing centers may be damaged, making the process of thinking much slower. This doesn't mean that a person is unable to understand something, but it may take them longer.

When a person is slow in processing information, you may notice:

- Getting a part (but not all) of what is being said.
- Taking a long time to answer questions.
- Appearing lazy.
- Showing signs of fatigue (zoning out, looking sleepy).

What you can do to help:

- Keep things simple. Present one idea at a time.
- Check in—have the person repeat what they understood to make sure you are on the same page.
- Slow down your speech, and make sure you give a client enough time to respond to questions.

PROBLEM	EXAMPLES	WHAT TO DO
Getting part of a message	Alex seems confused after discussions and sometimes doesn't remember all that we talked about.	Present one concept at a time to Alex. Wait for recognition before moving on. Write important concepts down on paper that are visible to Alex.
Delayed responding	Jon may continue to talk about something after the topic has changed.	Be sure to give Jon plenty of time to respond to questions. Be aware that he has likely missed the change in topic, and re-introduce the information.
	Sanjita just seems to be very quiet. Sometimes she doesn't answer at all.	Provide Sanjita with a cue, and give more time to respond. "Sanjita, we were talking about triggers. Did you have anything to add?"

Clients are likely to need some support to...

Understand the impact of brain injury and substance use

Remember what to do and when

Make decisions and set clear goals

Make plans and problem-solve

Get started starting

Keep track of goals and evaluate progress

Key Considerations in Program Development:

Longer-term interventions and smaller caseloads may be required to adequately address clients' needs. Clients with brain injury present with greater symptom complexity and are likely to require longer periods of intervention along with more integrated aftercare supports.

Coordination with community partners will be needed. This will likely require actively reaching out to, and creating partnerships with, brain injury providers and other support agencies in the community.

Providers should recognize the elevated risks for impulsive behavior, including suicide, and regularly assess suicide risk.

Providers should be aware of these elevated risks of pain, seizure, endocrine, and neurogenerative disorders and make referrals for assessment as required.

Functional Compensation

Below are some examples of using environmental supports to address the cognitive difficulties you observe.

WHAT YOU OBSERVE	POTENTIAL BARRIERS	CUE	PLANNING	DIRECT	BEHAVIORAL
Missing Appointments.	Memory: Forget appointment time. Initiation: Miss cues that it is time to go. Neglects goal.	Alarm in phone. Wall calendar.	Use Goal Management Training. Does the client have transportation, have a fare, and know the route?	Escort to appoint-ment. Phone-call reminder.	Incentive for attendance and task completion. Eliminate potential distractions occurring before or during the appointment.
	Gets distracted by trigger.	Gets distracted by trigger. Goal sheet to remind the client of goals.	Take a different route to avoid triggers.		Plan for activity that will compete with trigger situation (e.g., attend a meeting or time with a supportive friend).
Not Completing Assignments.	Forgets or gets distracted.	Cue between sessions.	Make a plan for a particular time and date to complete the assignment.	Complete assignment in session, or coach between sessions.	Offer an incentive for task completion. Pair tasks with something that occurs routinely. Start with very simple tasks, and gradually phase in more complex tasks.
Triggered to Use.	Having available money.	Reminder in wallet about budget.	Plan to leave cash and cards at home except for shopping for necessities.	Guardian or trustee for finances.	Offer incentive for completion of task.
Missing Medication Doses.	Forgetting dose or not taking medications at the correct time.	Daily dose packag-ing. Alarms in phone.	Packing list for day's activity. Simplifying dose regimens when there are multiple medications. Planning doses around routine activities (after evening news, before breakfast).	Directly dispensed and observed doses.	

Pulling It All Together (worked example)

Using a table like the one below will help you to organize your interventions for treatment planning purposes. Consider how your clients' difficulties might impact their ability to participate in treatment and address treatment goals.

	ALERTNESS/ FATIGUE	ATTENTION	PROCESSING	MEMORY	EXECUTIVE COMMUNICATION BEHAVIOR
Observations	Sleepy in appointments after 2 p.m. Often arrives hungry.	Changes topic, distracted by noise.	Gets only part of the message.	Needs reminders for appt. and tasks.	Dominates in groups. Often makes off-color jokes.

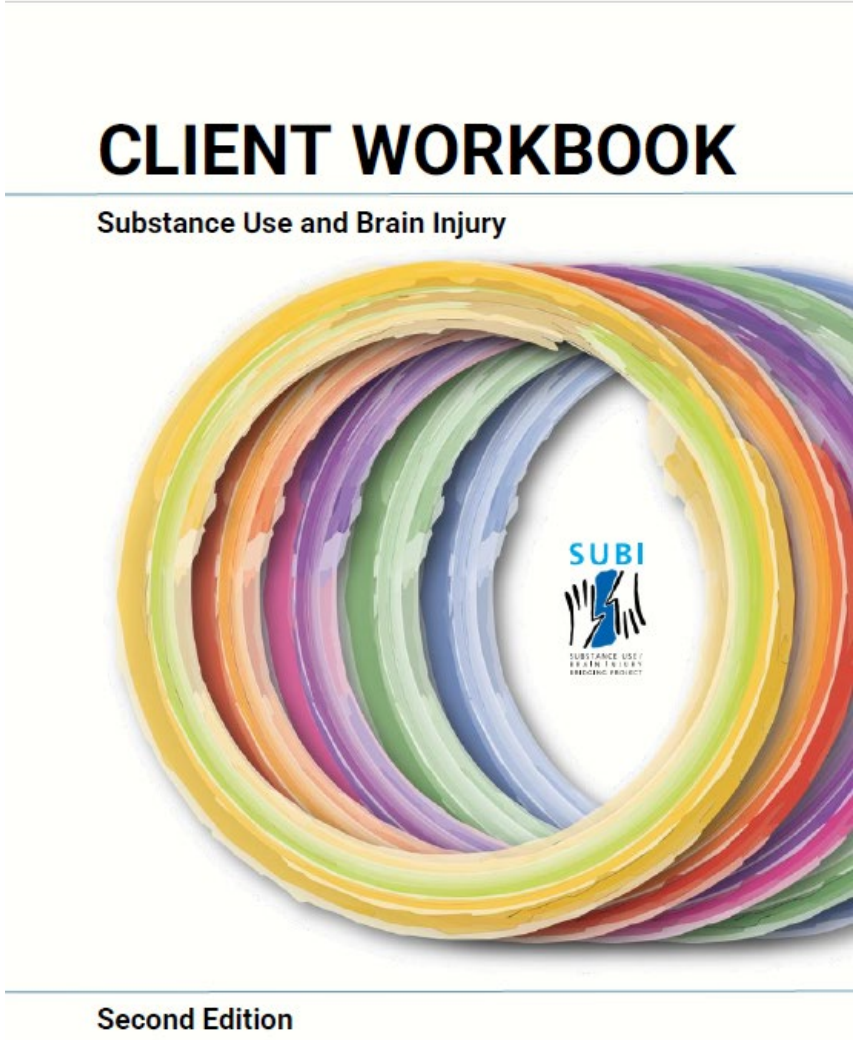
GOAL AREA	SUPPORTIVE STRATEGIES
Attendance and participation	Review how to make reminders in phone (set alarm for one hour before appointments). Schedule for morning appointments.
Attention and comprehension	Use notes in session as cue for topic. Take picture for reminder. Slow down/ break down messages.
Learning and remembering new information	Picture of session notes. Review previous session at start of session. Organize information into top two or three things to remember. Repeat key messages.
Following through with tasks	Make specific plans, and help to create reminders in phone or as notes/ posters at home. Break tasks down into small elements. Encourage client to enlist help of family to support follow-up.
Understanding strengths and needs	Use goal setting. Ask client to predict behavior/track progress. Review events, and modify approach as needed.
Setting realistic goals	Encourage client to dream big and start small with a goal that can be done in the next week. Build on most recent success.

Care planning

- Encouraging specific goals related to managing ABI symptoms.

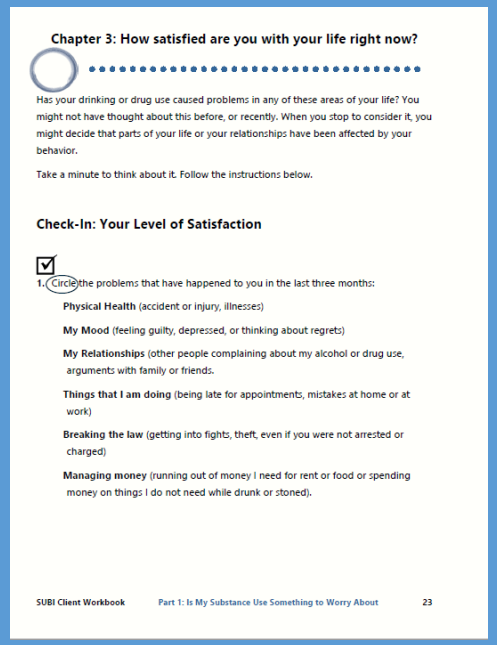
Introducing SUBI workbook 2.0

- MI adapted approach
  - Inclusive language
  - Readings to be completed with a client to encourage discussion
  - Exercises to encourage self-reflection
- Is my Substance use Something to Worry About?
- Tackling My Substance Use
- Coping strategies for Life
- Skills for Maintaining Health and Relationships
- Pulling it All Together



SUBI workbook 2.0

- MI adapted approach
- Inclusive Language
- Brief readings to encourage discussion and reflection



Chapter 3: How satisfied are you with your life right now?

Has your drinking or drug use caused problems in any of these areas of your life? You might not have thought about this before, or recently. When you stop to consider it, you might decide that parts of your life or your relationships have been affected by your behavior.

Take a minute to think about it. Follow the instructions below.

Check-In: Your Level of Satisfaction

1. Circle the problems that have happened to you in the last three months:

Physical Health (accident or injury, illnesses)

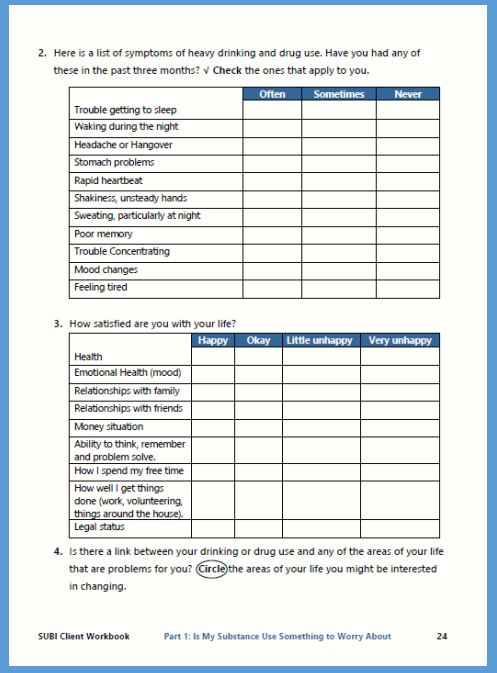
My Mood (feeling guilty, depressed, or thinking about regrets)

My Relationships (other people complaining about my alcohol or drug use, arguments with family or friends.

Things that I am doing (being late for appointments, mistakes at home or at work)

Breaking the law (getting into fights, theft, even if you were not arrested or charged)

Managing money (running out of money I need for rent or food or spending money on things I do not need while drunk or stoned).



2. Here is a list of symptoms of heavy drinking and drug use. Have you had any of these in the past three months? √ **Check** the ones that apply to you.

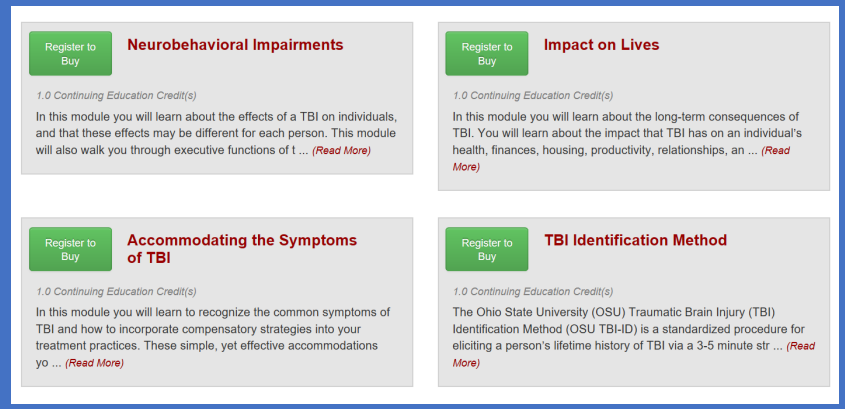
	Often	Sometimes	Never
Trouble getting to sleep			
Waking during the night			
Headache or Hangover			
Stomach problems			
Rapid heartbeat			
Shakiness, unsteady hands			
Sweating, particularly at night			
Poor memory			
Trouble Concentrating			
Mood changes			
Feeling tired			

3. How satisfied are you with your life?

	Happy	Okay	Little unhappy	Very unhappy
Health				
Emotional Health (mood)				
Relationships with family				
Relationships with friends				
Money situation				
Ability to think, remember and problem solve.				
How I spend my free time				
How well I get things done (work, volunteering, things around the house).				
Legal status				

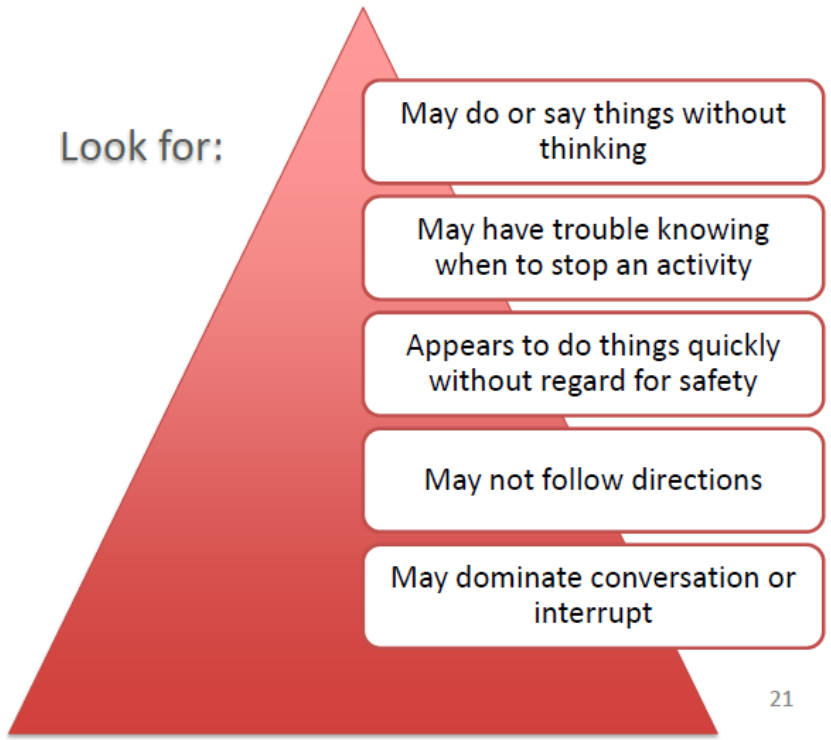
4. Is there a link between your drinking or drug use and any of the areas of your life that are problems for you? Circle the areas of your life you might be interested in changing.

WWW.Ohiovalley.org



Problem = Impulsivity

Sometimes it is difficult to start an activity, and other times it is hard to stop one. Problems with impulsivity are very common in persons with TBI.



Accommodating Problems with Impulsivity

Stop, Think, Act

- Teaching "Stop, Think, Act" encourages a person to slow down and think about the consequences of a behavior or activity before deciding to act (e.g. Is this a good idea or a bad idea? What might happen? Is this consistent with my goals?)

Immediate Gratification

- Providing incentives for shorter-term goals (e.g. gift cards for attending appointments) may improve compliance in the short term when the person is unable to keep a longer-term goal in mind

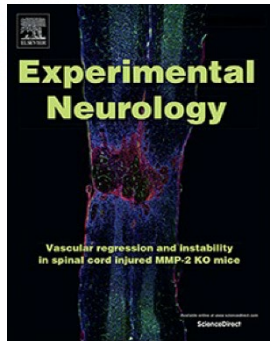
Give Feedback

- Respond directly to inappropriate behavior. For example, say, "What you just said was not OK."
- Be clear when setting expectations, limits and consequences

Review Article

Does pediatric traumatic brain injury cause adult alcohol misuse: Combining preclinical and epidemiological approaches

Zachary M. Weil[a,*], Kate Karelina[a], John D. Corrigan[b]

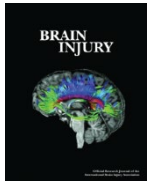


Review Article

Brain interrupted: Early life traumatic brain injury and addiction vulnerability

Lee Anne Cannella[a,b], Hannah McGary[a], Servio H. Ramirez[a,b,c,*]

Does Traumatic Brain Injury Cause Risky Substance Use or Substance Use Disorder?



Christopher M. Olsen and John D. Corrigan

Biological Psychiatry

Association between pediatric TBI and mental health and substance use disorders: A scoping review

Nasrin Adams (Nejatbakhsh), Danielle Dawson, Mark Hutchison & Peter Selby

ARTICLES | JANUARY 25 2024

Mild Traumatic Brain Injuries and Risk for Affective and Behavioral Disorders FREE

Richard L. Delmonico, PhD ✉; Lue-Yen Tucker, BA; Brian R. Theodore, PhD;
Michelle Camicia, PhD, MSN, CRRN, CCM, NEA-BC, FAHA, FARN, FAAN; Charles Filanosky, PhD;
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Pediatrics (2024) 153 (2): e2023062340.
https://doi.org/10.1542/peds.2023-062340 **Article history**

A cohort study of mTBI cases and matched comparisons within an integrated health care system.

The mTBI group included patients ≤17 years of age, diagnosed with mTBI from 2000 to 2014 (N = 18 917).

Comparisons included 2 unexposed patients (N = 37 834) per each mTBI-exposed patient, randomly selected and matched for age, sex, race/ethnicity, and date of medical visit).

Outcomes included a diagnosis of affective or behavioral disorders in the 4 years after mTBI or the reference date.

Cognitive Impairment

MoCA Screening Studies

Drug and Alcohol REVIEW

APSAD

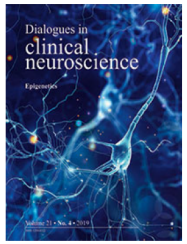
Drug and Alcohol Review (May 2019), 38, 435–442
DOI: 10.1111/dar.12922

Prevalence of cognitive impairment in patients with substance use disorder

CAROLIEN J. W. H. BRUIJNEN[1,2,3], BOUKJE A. G. DIJKSTRA[2,4], SERGE J. W. WALVOORT[1,2], WIEBREN MARKUS[2,5], JOANNE E. L. VANDERNAGEL[2,6,7], ROY P. C. KESSELS[1,3,8] & CORNELIS A. J. DE JONG[2,9]

Results

- 1 in 3 patients
- More in older clients
- Memory ETOH > Cannabis
- Visual Spatial Opioids > Cannabis or stimulants



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Dialogues in Clinical Neuroscience

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/tdcn20

Cognition and addiction

Antonio Verdejo-Garcia, Gloria Garcia-Fernandez & Geert Dom

To cite this article: Antonio Verdejo-Garcia, Gloria Garcia-Fernandez & Geert Dom (2019) Cognition and addiction, Dialogues in Clinical Neuroscience, 21:3, 281-290, DOI: 10.31887/DCNS.2019.21.3/gdom

To link to this article: https://doi.org/10.31887/DCNS.2019.21.3/gdom

Moderate Impairments of memory, executive functioning, reward expectancy valuation and learning.

Deficits in higher order learning impairments predict lapses.

Cognitive rehabilitation addressing reward expectancy, goal-based decision making and impulsivity show potential to improve outcomes

frontiers | Frontiers in Psychiatry

TYPE Opinion
PUBLISHED 12 October 2023
DOI 10.3389/fpsyt.2023.1281914

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Patients with cognitive deficits and substance use disorders, a clinical population in need of focused attention

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Drop-out from addiction treatment: A systematic review of risk factors

Hanne H. Brorson [a], Espen Ajo Arnevik [a b], Kim Rand-Hendriksen [c d], Fanny Duckert [a]

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Corrigendum to "Drop-out from addiction treatment: A systematic review of risk factors"
Clinical Psychology Review, Volume 76, March 2020, Pages 101796
Hanne H. Brorson, Espen Ajo Arnevik, Kim Rand-Hendriksen, Fanny Duckert

- Up to 50% of patients admitted to residential programs screen positive for cognitive impairment.
- Cognition has an impact on treatment and outcome.
  - Higher dropouts
  - More Lapses
- Non-addiction and addiction factors contribute (including TBI)
- The path of care may be different

https://doi.org/10.1186/s13012-023-01289-w

RESEARCH Open Access

Implementing traumatic brain injury screening in behavioral health treatment settings: results of an explanatory sequential mixed-methods investigation

Kathryn A. Hyzak[1*], Alicia C. Bunger[2], Jennifer Bogner[1], Alan K. Davis[2,3,4] and John D. Corrigan[1,5]

- Trained 1,215 providers from 25 organizations in the OSU-TBI-ID
- Follow-up at 1 month to determine the number of screens administered, and providers were interviewed.
- Only 25%(55/215) providers adopted screening.

"Providers explained that although TBI screening can improve diagnostic and clinical decision-making, they discussed that additional training, leadership engagement, and state-level mandates are needed to increase the widespread, systematic uptake of TBI screening."

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"Providers explained that although TBI screening can improve diagnostic and clinical decision-making, they discussed that additional training, leadership engagement, and state-level mandates are needed to increase the widespread, systematic uptake of TBI screening."

All done

Brain Injuries: A Frontline Perspective on Strategies to Support PWUD in Community

Ottawa Inner City Health

Sherye Pearce & Jamie Boyd

17 July 2025

Presentors

Sherye Pearce RN, BSN

Mental Health Nurse Coordinator
Merivale Supportive Housing

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Nurse Coordinator
TED Program

About OICH

Ottawa Inner City Health Inc. (OICH) started in 2001 as a response to local healthcare providers struggling to meet the needs of people who were homeless and had complex health needs. We opened our first program—a palliative care hospice in partnership with the Ottawa Mission.

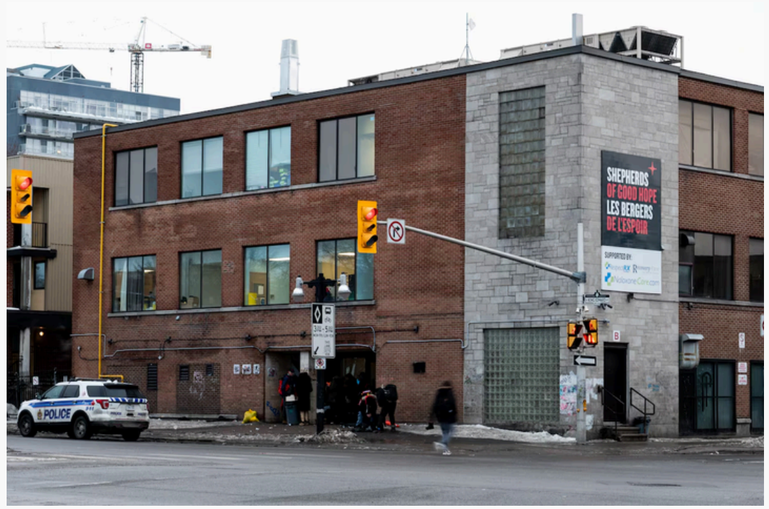
Since that time, we continued to grow and open more programs throughout homeless shelters in the city, our aim was to ensure that people facing barriers to good health received the same quality of healthcare as other Canadians. Now, over 20 years later, OICH has 5 special shelter-based healthcare services, 6 supportive housing services and outreach programs.

The healthcare we provide is firmly rooted in evidence-based research, a harm reduction framework and a fierce love of our clients and the incredible community they bring to us. Our clients are resilient, and strong and they continue to be our biggest teachers every day.

TED (Targeted Engagement and Diversion) Program

The Targeted Engagement and Diversion (TED) is a 24/7 healthcare program which is embedded in the Temporary Enhanced Shelter Program (TESP) operated by Shepherds of Good Hope.

- TED is run by RPNs and CCWs in collaboration with Shepard's front line staff with RN oversight and MD support
- TED provides accessible treatment and healthcare for people experiencing homelessness who have complex healthcare needs. This includes nursing, mental health services, intensive case management, peer support for appointments, nurse practitioners, psychiatry, access to an internist and medical monitoring
- TED is also a 24-hour monitoring service for homeless people under the influence of drugs and alcohol which allows them to safely detox in the community rather than in a hospital ER
- TED staff respond to and reverse overdoses in and around the shelter property



Practical Strategies in TED Context

What evidence tells us works…

- Try to create structure and routine
- Try to meet with the person one on one with as little distraction as possible
- Use one mode of communication at a time
- Accompany clients to appointments
- Keep copies of everything
- Don’t assume the client can read or write or navigate public transportation
- Identify triggers
- Positive reinforcement…negative consequences don’t work!

Practical Strategies in TED Context

What we struggle with

- Very challenging to create structure in a program like TED (transient nature of population, can't stay on unit all day, don't get the same bed every night, different staff) however we structure what we can (set bin times/rules, same time to come in and leave unit)
- Try to meet with the person one on one with as little distraction as possible is difficult as shared dorms, 1 hallway for clients to access medications, their belongings, accessing service but we meet people where they are most comfortable and often will utilize our observation rooms for confidentiality and reduce stimulation

What we have had success with

- Be intentional with communication and have purpose with every interaction - use simple wording, 1 request/direction/question at a time, allow time for reflection/processing as this is generally slower. Speak directly at them, being intentional/mindful/not distracted
- Accompany clients to appointments (peer program, reminders from team, apt cards)
- Keep copies of everything (CM team does great job in keeping ID/documents (BC, OHIP) as these things are often lost/stolen
- Don't assume the client can read or write or navigate public transportation (peer support, taxi chits)
- Identify triggers (create care plan with clients, aggression care plan in which they can have input in what would help them be successful, put it on their chart for staff to know)
- Positive reinforcement...negative consequences don't work! (celebrate the little wins, remind them they are worthy of care when there are losses, every day is a new day, repairing relationships when there is conflict/bad interaction)
- Offering choices, set boundaries, and following through with consequences. Setting boundaries is caring!
- Choose your battles and be mindful/intentional about control. As much as possible, give people autonomy

TED

Front Line Example

- Young indigenous male in his 30s
- Pmhx. FASD, significant polysubstance use (opiates, alcohol, stimulants) and mental illness (PTSD, depression with chronic SI), brain injury (traumatic + from ODs)
- Sustained a significant foot injury from attempted suicide that required long-term hospitalization for burns, multiple surgeries for injuries and complications and left hospital AMA +++
- **Challenges** - including managing a fresh post op wound, arranging follow-up appointments when ++ missed, using drugs in program, intentionally overdosing when staff wouldn't give him Ensure, verbal aggression
- **Mitigating Strategies** - Created a contract that client would not use in program, would take abx/connect with wound care/go to f/u appointments in exchange for daily Ensure, connected him with CMHA worker, supported with appointments, positive re-enforcement when engaging in care, and setting boundaries (time outs) when needed
- **Result** - Client is currently housed in Supportive Housing, he bikes around, noticeable improvement in regulating emotions/managing impulsivity, engaged in his health care, using brave button when using to prevent ODs, negotiating for Ensure instead of taking lethal measures

Merivale Residence

- Housing clients with substance use disorders, mental health, and complex health needs, who were living rough or in the shelter system
- The focus is on helping clients gain autonomy, dignity, and develop independence
- Staff are trained at administering medications, safer supply, responding to overdose, and conflict resolution
- Services offered: peer support, monthly residential meetings, incentives like gift cards to maintain hygiene and a clean room, meals provided, laundry, visitors allowed, own room with TV and cable, resident phone

Story Time: "Johnny"

- Johnny had suffered a few strokes causing significant brain injury. He also continued using substances which prevented his brain from healing
- Due to his brain injury and substance use, it has affected his cognitive ability to make appropriate judgement calls, has caused him to be forgetful, and he often displays undesirable behaviours, like anger

What Works	vs	What Doesn’t Work
Remain calm		Don’t power struggle
Speak slow and softly		Don’t give in to negative behaviours
Maintain firm boundaries		Don’t yell and get angry with them
Keep a safe distance		Don’t stand too close
Be consistent		Being inconsistent

What is important for service providers to understand about brain injury, particularly among clients who use drugs or may be unhoused?

- Brain injury is often unrecognized by our system of care
- Folks fall through the gaps and remain misunderstood
- We label Homeless people with ABI/ TBI:

Difficult to engage

Non-compliant

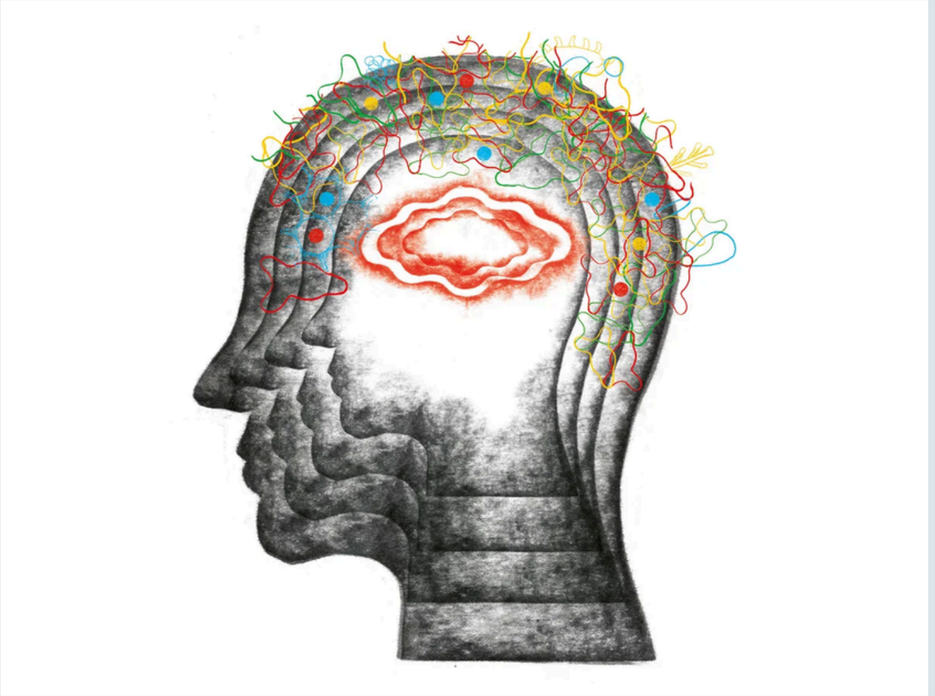
Poor Historian

Not motivated

Disorganized

- And.... they remain homeless for decades by developing survival skills

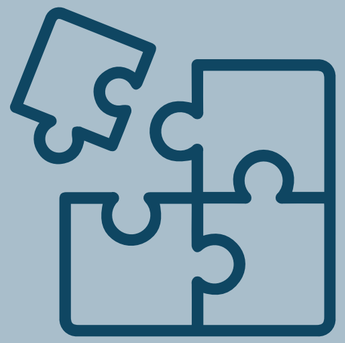
Each brain injury is unique and no two clients are the same. It is important to understand that this is a lifelong joinery for the client and often things don't get better due to their substance use and living rough



How to help....

Navigate services

- Do your research
- Offer resources and allow opportunities for independence
- Use your team



Attend Appointments

- Peer Support
- Transportation
- Support with booking/prep
- Access to f/u information

Retain Information

- Different forms of communication
- Repetition
- Consistency

A team approach to working with people with brain injuries

- OICH is currently developing a Safety & De-escalation Training specific to our work place and the population we serve to better support our staff and clients
- Staff are provided with education on how brain injuries might present and strategies on how to manage challenges, including:
  - Manage expectations - client's abilities / recognizing it may take months to years to re-pattern behaviour
  - Validating feelings and acknowledging that working with this populations is challenging
  - Monitor levels of frustration, take breaks, switch off with another staff
  - Remind the team of client success

- During an escalating situation:
  - Maintain self control
  - Maintain a safe distance
  - Maintain a non confrontational body stance
  - Analyse situation
  - Decide on an intervention
  - Debrief after a crisis

Thank you