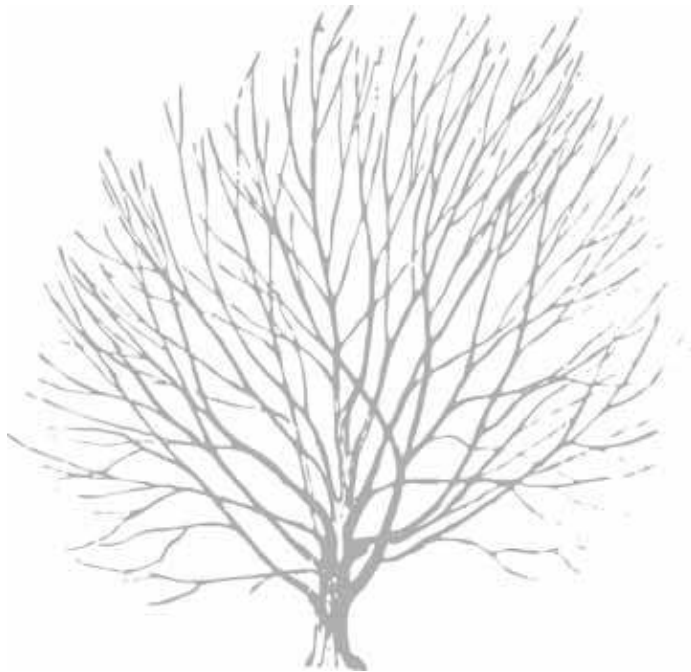


# **When Attempted Suicide is the Cause of Brain Injury: Implications for Rehabilitation**

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# Brain Injury and Suicide



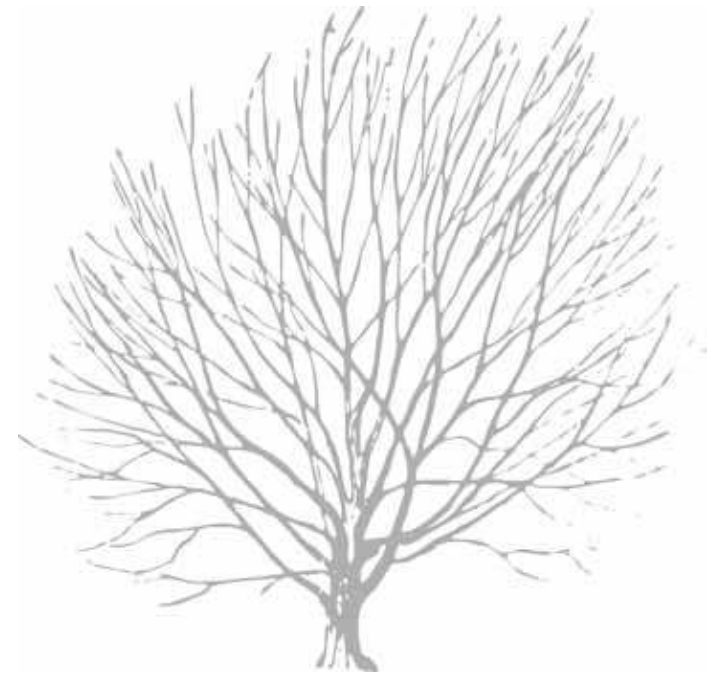
- The clinical literature regarding brain injury and suicide is devoted to post-injury occurrences
- The epidemiological literature regarding traumatic brain injury addresses suicide as a major cause of TBI

# **Epidemiology of Suicide as a Cause of Brain Injury**



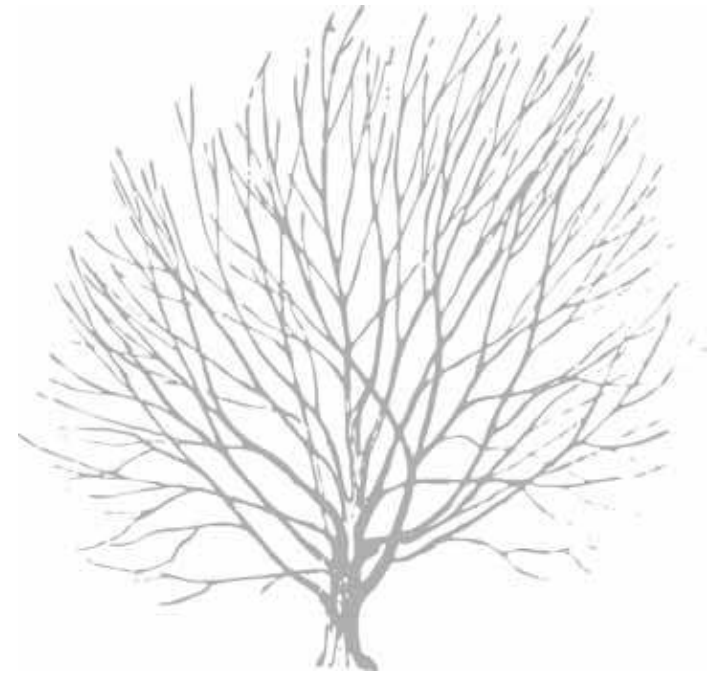
# Research Highlights

- 1980-1994 overall decrease in TBI death rate from 24.7 per 100,000 to 19.8 per 100,000
- Decline associated with fewer transportation and fall related deaths
- Firearm related deaths increased 11% from 7.6 per 100,000 to 8.4 per 100,000
- Source: Center for Disease Control Report, 2004



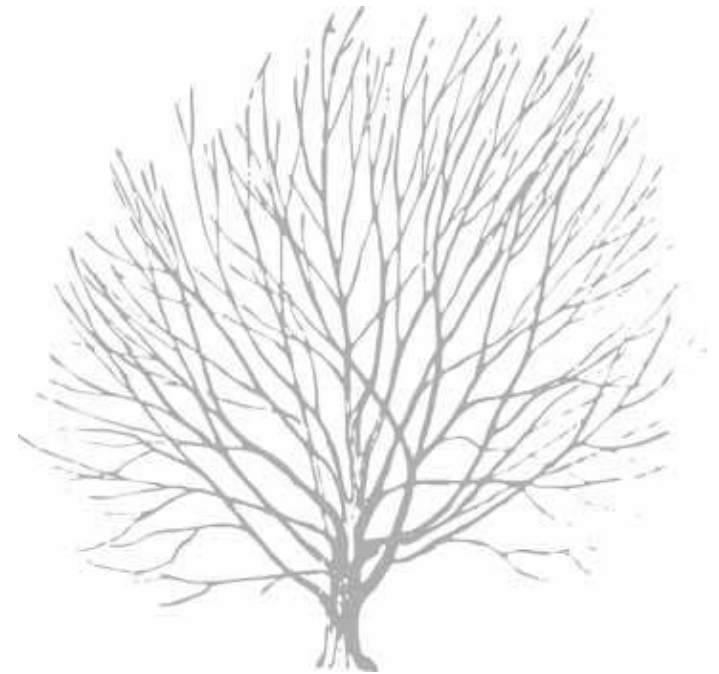
# Suicide Facts: Canada & USA

- In both countries, research identifies that 4 to 5% of the population has attempted suicide in their lifetime.
- One in nine persons has considered suicide
- In Canada, 12% of the hospital critical care and 2% of insurance reimbursements are related to suicide.
- Lifetime costs are a loss of 53 years of life and \$432,000 in economic productivity.



# Suicide Attempt and “Accident”

- 5% of single vehicle attempts are classified as intentional
- 10% of drowning deaths are suicide
- Under-reporting of suicide is 3-24% of all deaths
- Stigma and other factors account for under-reporting
- Suicide is one of the three leading causes of death in persons 15-35
- Attempt types may differ between regions and countries



# Firearms Related TBI and Suicide



- 66.5% of all firearms injuries were classified as “suicidal” in intent
- Firearms cause approximately 10% of all brain injuries, but are leading cause of TBI related deaths
- Overall 1994 TBI rate in U.S. is 94 per 100,000 per National Hospital Discharge Summary Data, the rate in 1974-1986 was 200 per 100,000
- Fewer transportation accidents, greater survivability and fewer inpatient admissions account for the reduction in overall rate

# Frequency and Prevalence

- In 1994, the TBI related death rate was 3.3 times higher in males than females
- Males 75+ years and 15-24 years were the peaks
- Firearm injuries were the leading cause of death for males 15-84 years





# Rural vs. Urban TBI's

*Source: Rural Institute Report, University of Montana 2002*

- Rural residents less likely to be insured and to have received comprehensive medical and rehabilitation services
- Rural families report greater difficulty in coping with “changes” in family member
- Profound gaps in rural services equate to minimal to no support following acute hospitalization
- Greater isolation
- Higher drug and alcohol use (Kreutzer, 1996)
- Greater frequency of suicide attempts



# Urban Environments

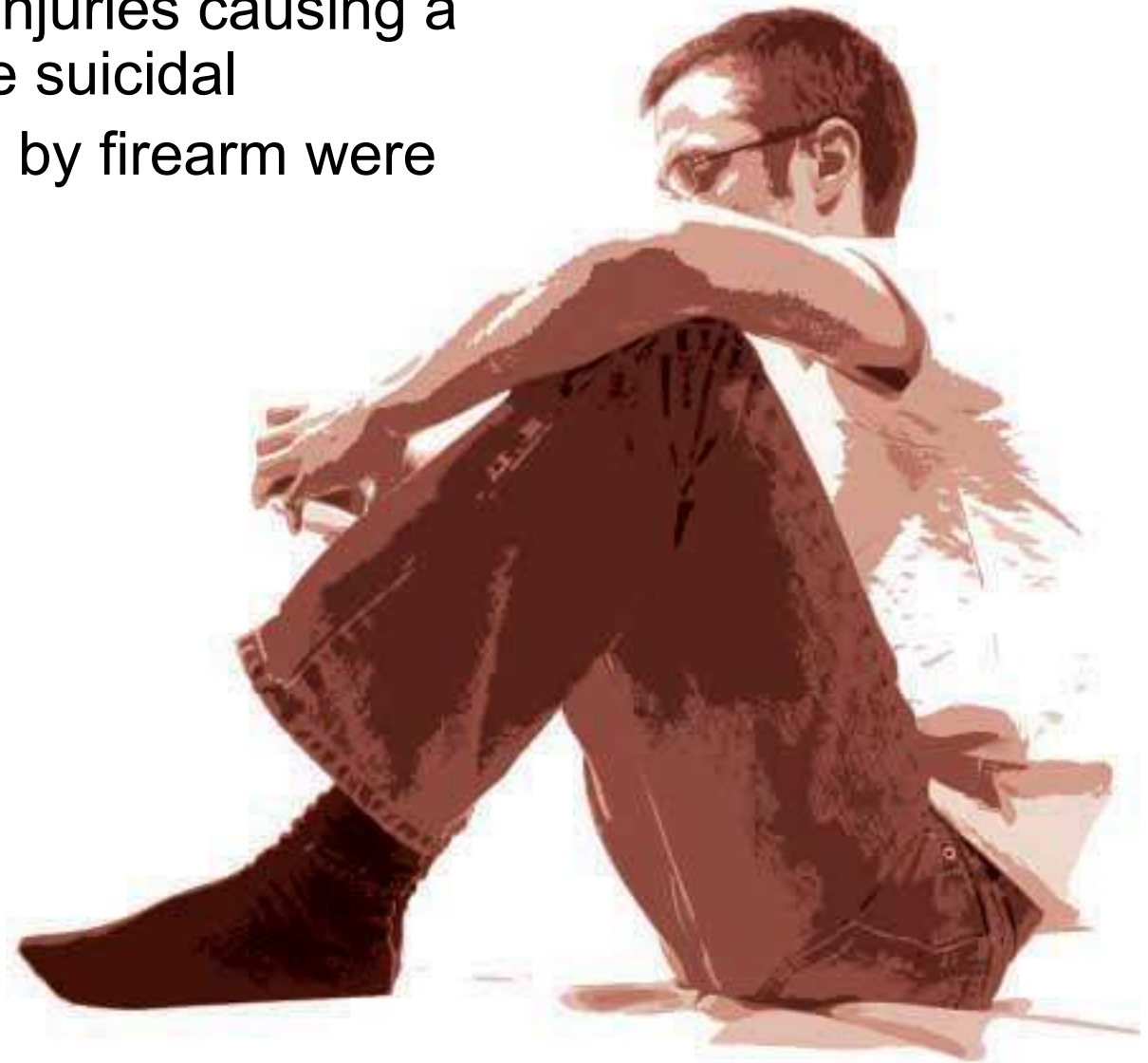
*Source: Injury Surveillance Program Report,  
Massachusetts Department of Public Health, 2002*

- TBI death rate was 8.3 per 100,000
- TBI accounted for 20% of all injury deaths
- 23% of all TBI injuries were caused by firearms
- Between 1995-2002, there was a 24% decrease in firearms related TBI deaths



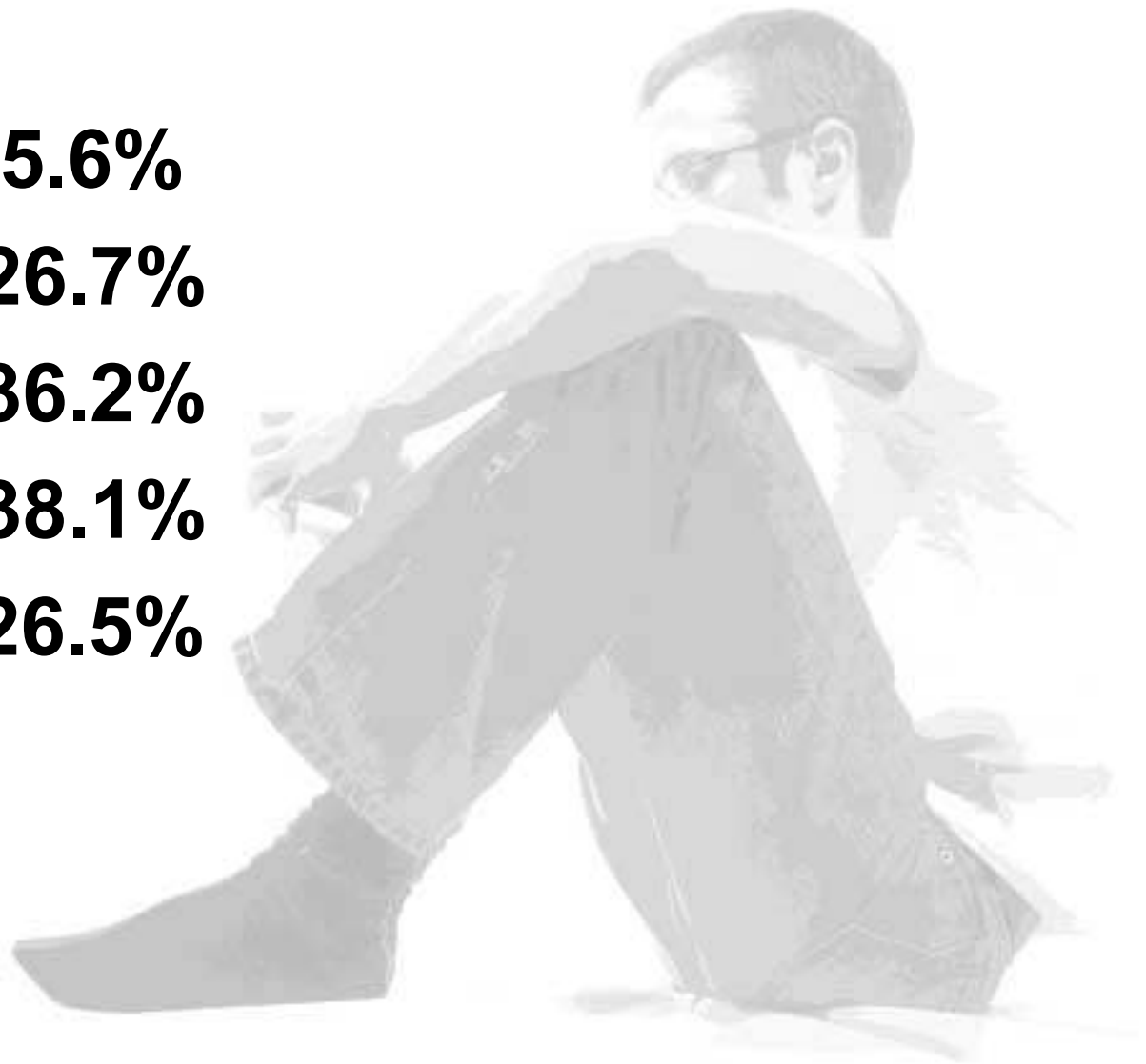
# Causes of Suicide Attempts Related to TBI

- 82% of intentional injuries causing a TBI and death were suicidal
- 77% of TBI caused by firearm were intentional
- Gunshot Injuries
- Hanging
- Carbon Monoxide Poisoning
- Overdose
- Electrocution
- Suicide by Cop
- Drowning
- Other methods



# Age Factors in Suicide Related TBI Cases

<b>Age 5-14 =</b>	<b>15.6%</b>
<b>Age 15-25 =</b>	<b>26.7%</b>
<b>Age 25-44 =</b>	<b>36.2%</b>
<b>Age 45-64 =</b>	<b>38.1%</b>
<b>Age 65+ =</b>	<b>26.5%</b>



# Factors in Suicide Related TBI Cases

- Individuals with legal concerns
  - Crime victims or individuals exposed to a crime
  - Unemployment (Kposowa, 2001)
  - Occupational Risk: Physicians, pharmacists, dentists, police, mental health professionals (Boxer, 1995)
  - Ages 15-35 and 65+ (WHO, 1999)
  - Gender: Males 75-90% of all suicides (Canetto and Sakinofsky 1998)
  - Gender: Female 14-29 years, highest rate of non-fatal injuries (Canetto & Sakinofsky)
  - History of child abuse (Dieserud, 2002)
  - Ethnicity: Higher in aboriginal/native communities (Graham, 2002)
  - Rural vs. Urban Dwellers
  - Marijuana abuse initiated before age 17, 3.5 times more likely to attempt suicide (Lynskey, 2004)
- 

# Predisposing Factors

- Childhood Trauma
- Adult PTSD
- Abuse, higher rate among individuals with sexual abuse histories
- Substance Abuse
- Mood disorder(s)
- History of depression
- Borderline Personality Disorder
- Stressful life situation
- Family history of suicide



# Treatment and Rehabilitation Issues

- “Failed” Attempt, residual anger, self loathing
- Creation of new and additional issues to further underlying psychological/psychiatric problem
- Depression and despair, is current status “a fate better than death?”
- Mood control difficulties
- Injury site(s)
- Cognitive problems
- Physiologic problems
- May be regarded as psychiatry’s problem, not rehabilitation
- Isolation, social withdrawal



# Suicide Attempts Post-TBI

- Related to hopelessness, perceived rehab failure, pre injury issues, life changes, Frey (2001)
- Rate of suicide no greater than other disabling conditions, Frey (2001)
- Behavioral changes, impulse control, depression, Felicetti (1991)
- Global despair, emotional dysregulation, Morton (2000)
- Social withdrawal and isolation, Sugarman (1999)
- Subsyndrome mood disorders, Sugarman and Hartman (1998)
- Self regulation and control, Barkley (1998) and Diller (1999)
- Relationship of social reintegration with cognitive recovery, Bond (1975)





# Suicide Attempts as the Cause of TBI

- Higher rates in rural areas
- Firearms as major method
- Male vs. Female
- Prior psychiatric history
- Previous suicide attempts
- History of substance abuse



# Mental Health Issues Create a Risk Potential

- History of depression
- History of physical, sexual or emotional abuse
- Borderline Personality Disorder
- Bipolar disease
- Impulse Disorders
- Dual Diagnosis



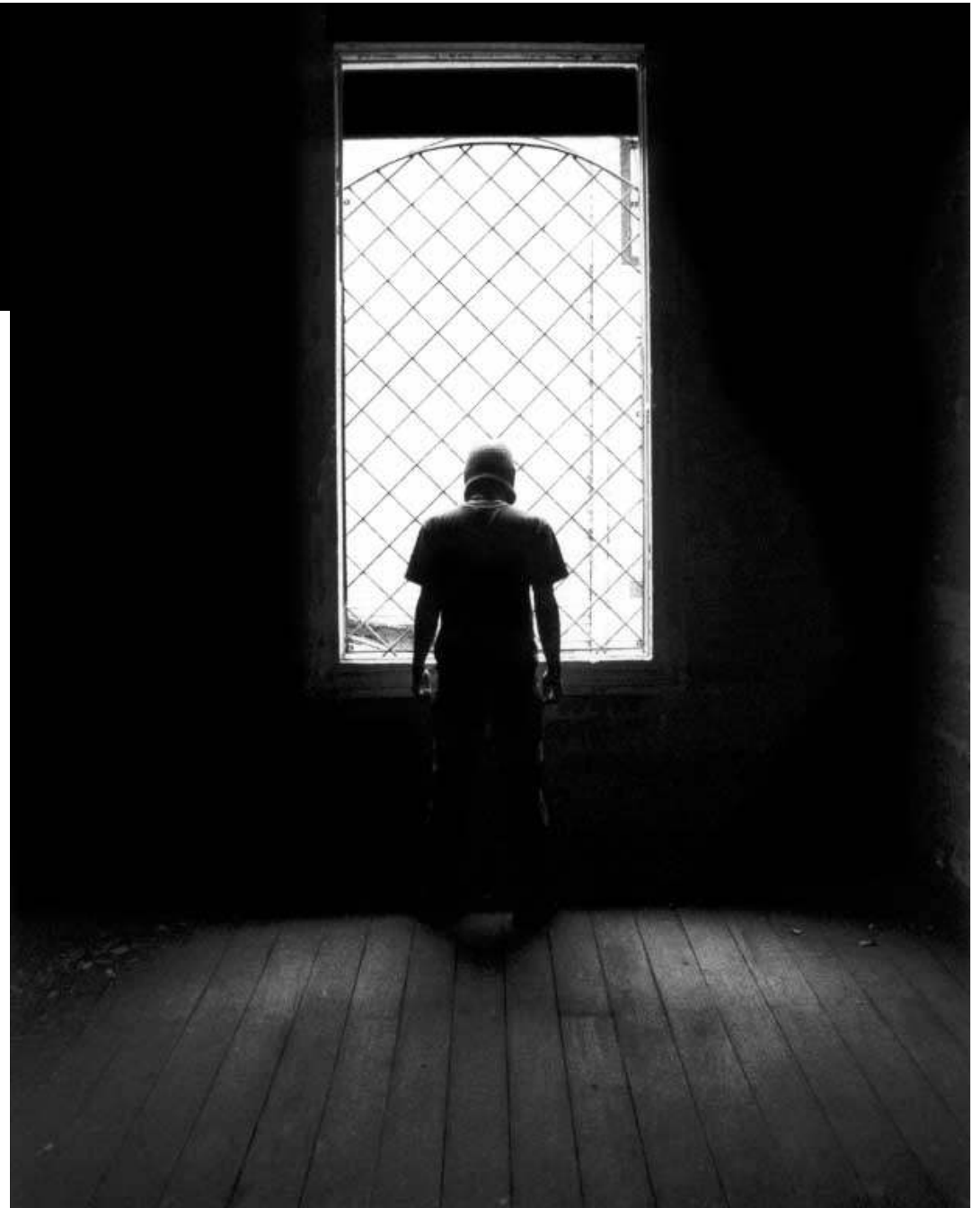
# Suicide by Cop

- Establishing crisis involving law enforcement authorities to create risk situation and exposure to harmful event
- Suicidal act administered by police
- One known case related to TBI reported in forensic journals



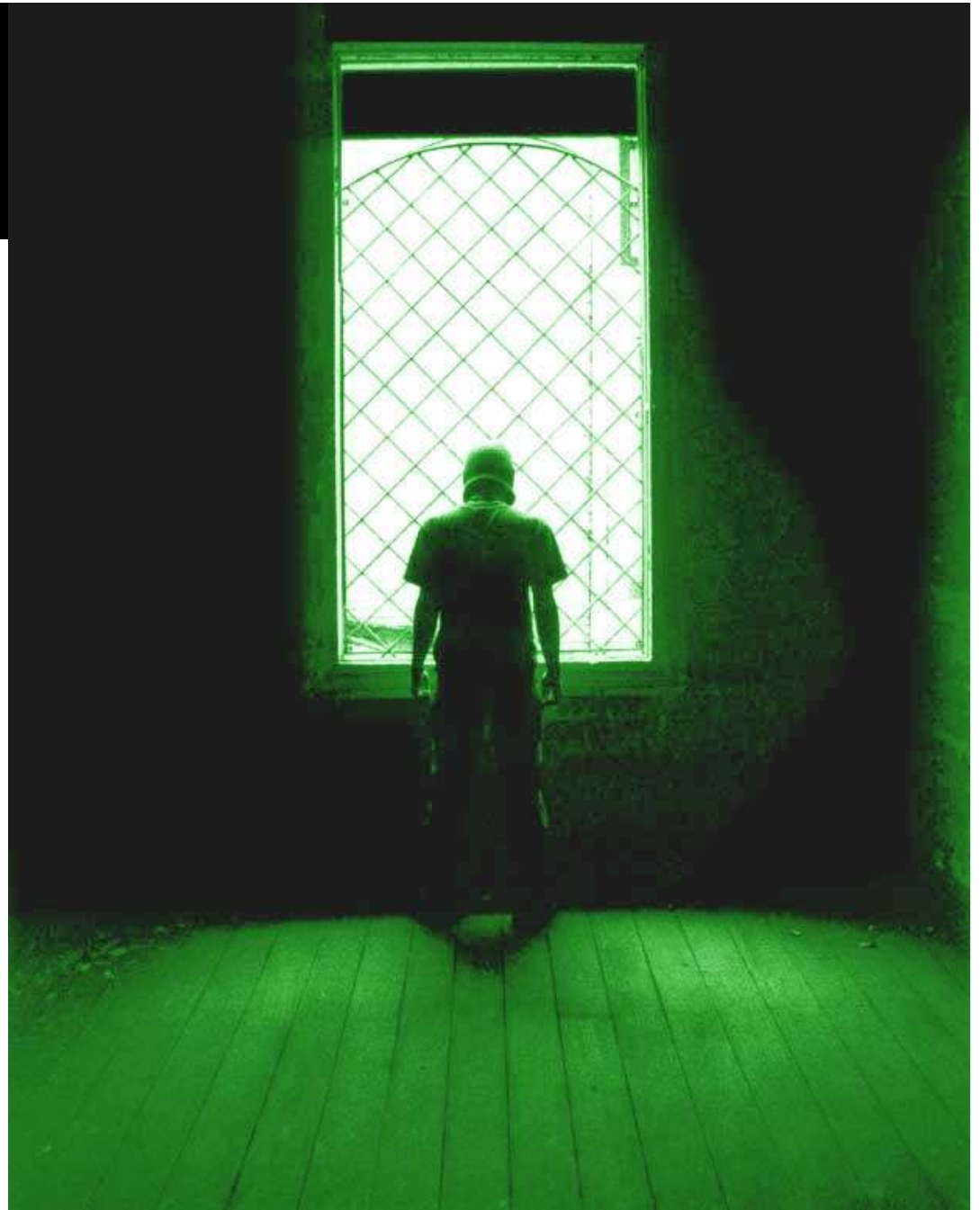
# Relationship of Suicide/TBI to Substance Abuse

- Higher among multi-drug users than single drug users
- Longer drug use histories
- Prior failed treatment for drug and/or mental health problems



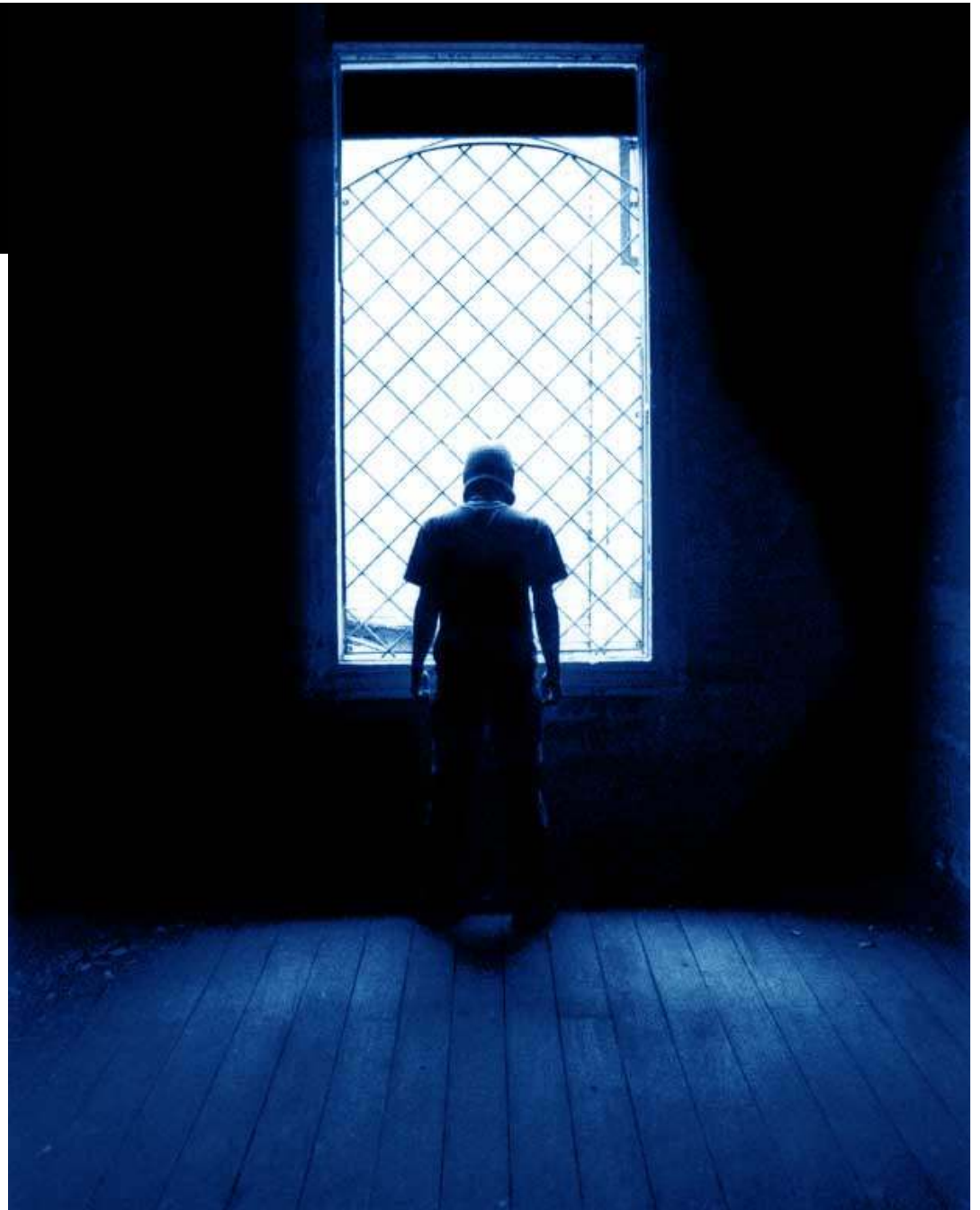
# Underlying Issues

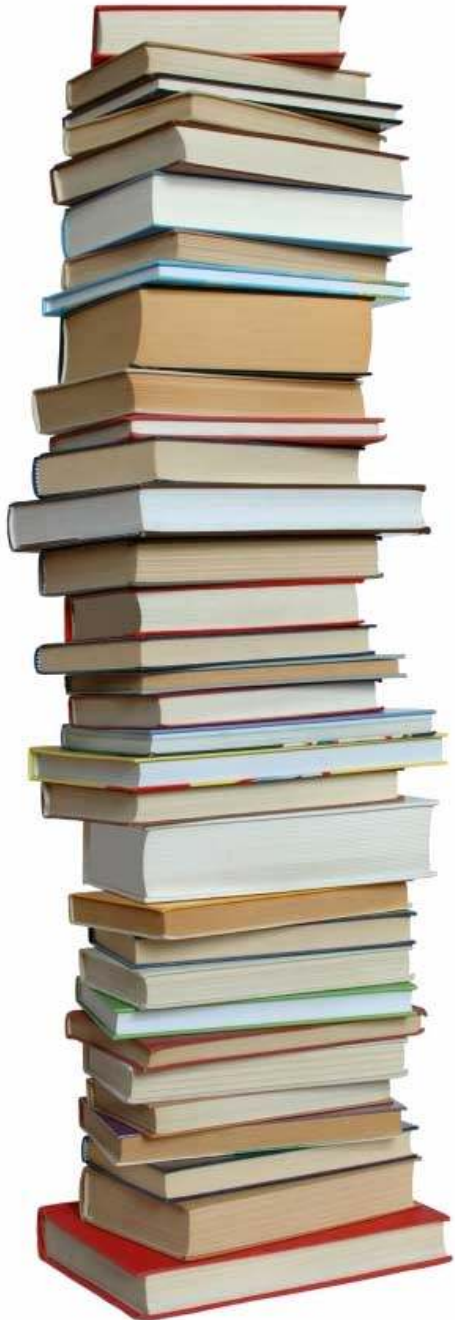
- Pre-event psychiatric/psychological problems
- Addiction and failed treatment
- PTSD
- Abuse history
- Impulse control problems
- Axis II diagnosis



# Post Injury Issues

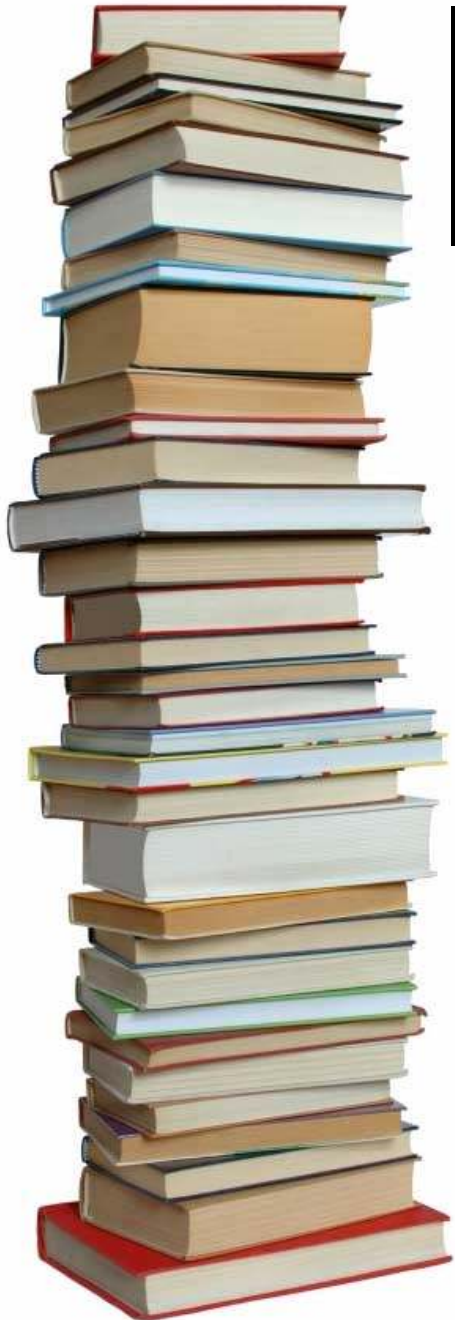
- Impaired awareness of deficits
- Social isolation
- Impaired self-regulation
- Mood state management problems
- Depression/despair





# NRI/NRIO 10 Year Outcome Study

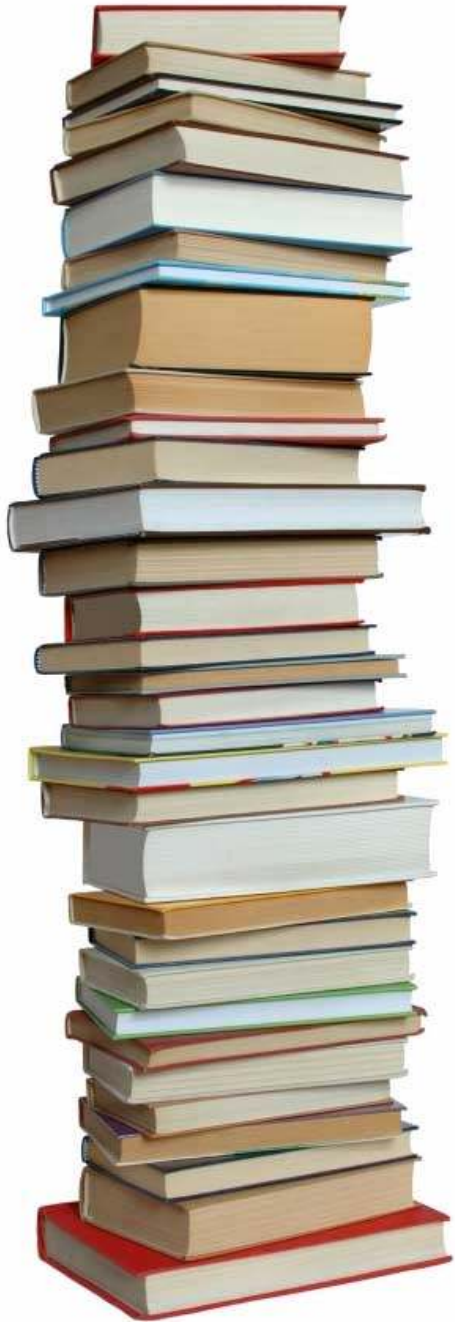
- Individuals with prior behavioral health problems had continuing behavioral health problems in the first 24 months post TBI
- Individuals with substance abuse problems experienced a greater likelihood of relapse in the first 24 months post TBI
- In cases identified with behavioral health and/or substance abuse problems the durability of the rehabilitation outcome was reduced due to increased potential for relapse
- Behavioral health and substance abuse stabilized and/or improved in the majority of cases after the 24 month point with continuing behavioral health care



## What Can We Learn from Case Examples?

- Premorbid mental health issues must be considered
- Self regulation of behavior and mood is critical to positive outcomes
- Role of cognitive impairment in adjustment to disability
- Multidisciplinary approach with full inclusion of psychiatry and psychology





# Case Study Checklist

- Premorbid Personality Factors
- History of Previous Attempts
- Dual diagnosis
- Recent psychosocial stressor(s)
- Cognitive deficits
- Behaviour problems
- Social network issues

# Profile: Pat



- 35 year old single female
- Unemployed, “trust fund”
- University graduate, some graduate education
- 20 year drug use history
- 10+ prior hospitalizations for detox and treatment
- Multiple arrests for drug related offenses

# Pat's Injury



- Gunshot injury, cranio-facial trauma, loss of right eye
- 5-7 day coma
- 4-6 week period of PTA, confusion and other cognitive symptoms lingering
- Referred for “dual diagnosis” program

# Pat's Rehabilitation



- Entered into TBI program from med surg bed
- Program consisted of neurologic rehab, addictions treatment and DBT
- Family therapy
- Approximately 120 days of inpatient rehab

# Pat's Outcome



- Moved rapidly through inpatient rehabilitation, “star pupil” in addictions and DBT program
- Unstable mood following family therapy sessions
- Unable to sustain herself in Transitional Living/Day Treatment program due to cravings
- Violated probation, elected to serve sentence in prison rather than continue in treatment

# Profile: Sue

- 50 year old female with BSN and graduate training
- Mother of two adult children
- History of bipolar disease with multiple previous suicide attempts
- Suicide via overdose, called children for help



# Sue's Injury

- Anoxic injury
- Coma length of approximately 21 days
- Significant vision loss
- 14 day period of agitation and confusion
- Rapid clearing and recognition of suicidal event and resulting deficits



# Sue's Rehabilitation

- Physical therapy
- Speech Therapy to address dysphagia/ swallowing problems
- Psychiatric evaluation, modification of medications
- No formal rehabilitation program, but trained senior neurorehab nurse and friend took on case management/ coordination





# Sue's Outcome

- Disabled, unable to work due to vision loss
- Reports stable on medications
- Insightful about cause of event
- Involved in psychotherapy



# Profile: Tom



- History of depression, substance abuse.
- Question of undiagnosed bi-polar disease
- 22 years old at time of second self-inflicted gunshot injury
- Entered TBI rehab after second injury

# Tom's Injuries



- Bi-lateral frontal injuries, significant cognitive and physical impairment
- Loss of right eye and hearing in right ear
- Massive facial injuries from second suicide attempt
- Lingered depression

# Tom's Rehab



- 45 days acute rehabilitation and 6 months post-acute rehabilitation, followed by supported living
- Depression responded to anti-depressant medication
- Participated in substance abuse treatment and AA in community

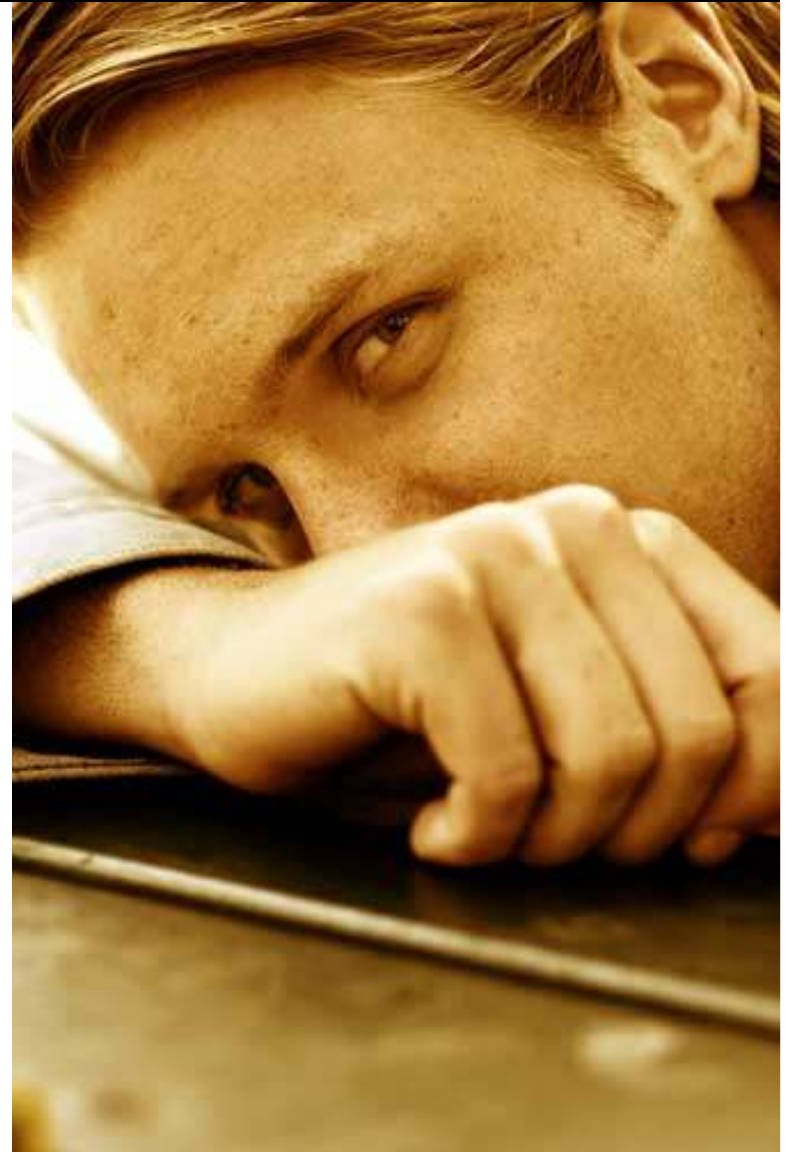
# Tom's Outcome

- Entered into vocational retraining program
- Returned to independence
- Attended outpatient counseling
- Maintained medication compliance



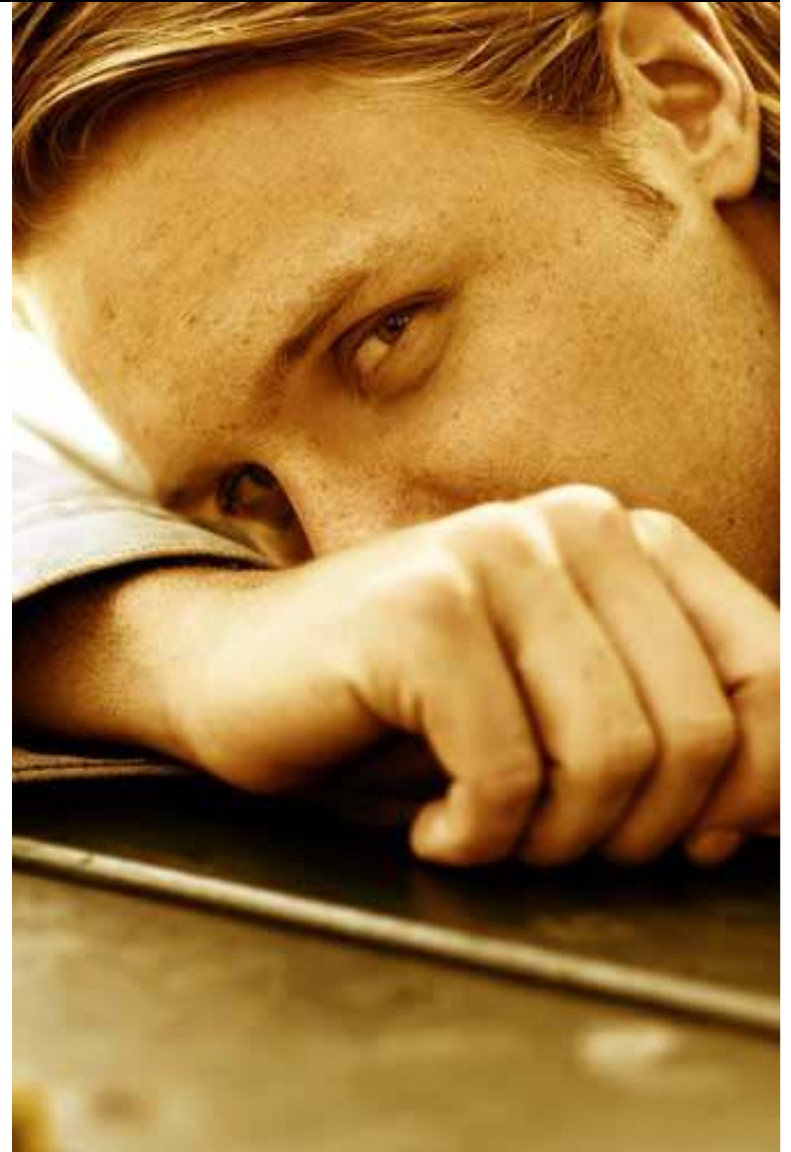
# Profile: Larry

- 21 year old, college senior
- History of ADHD
- History of poly substance abuse
- Family in consistent crisis with parental divorce, ongoing strife and acting-out of siblings
- Self-inflicted gunshot injury via “Russian Roulette”



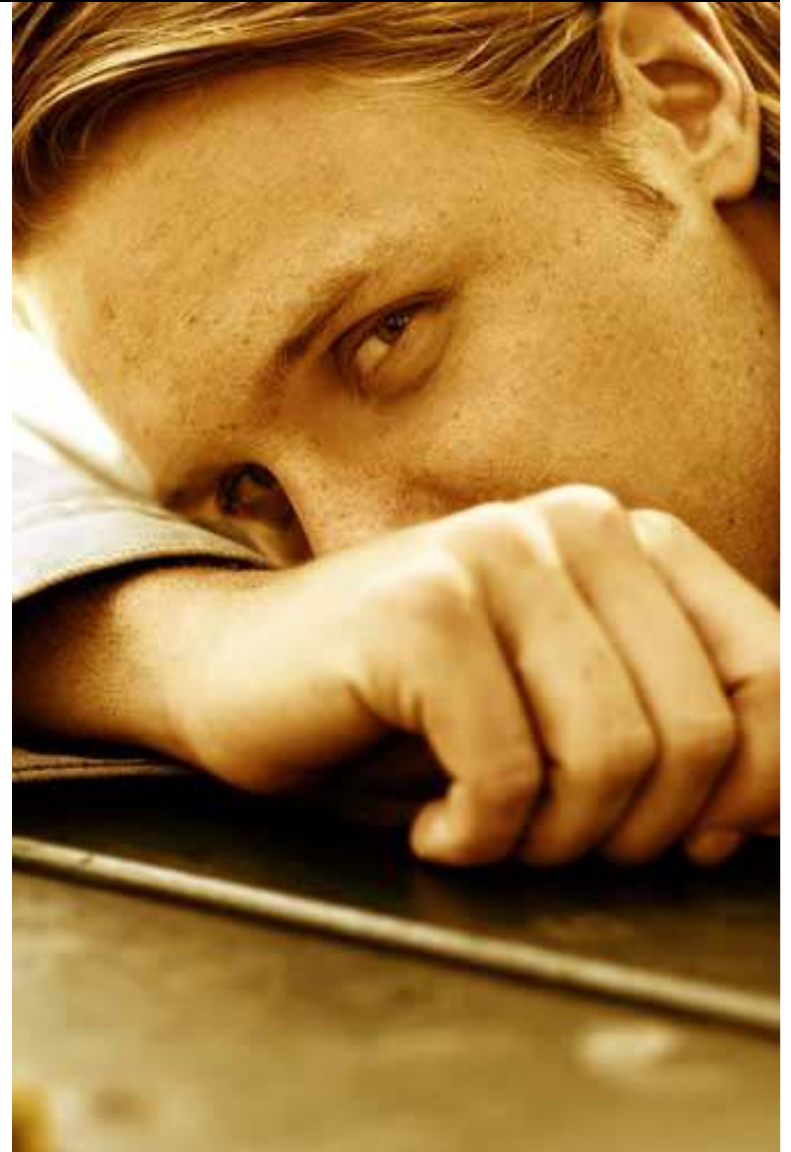
# Larry's Injury

- 3 day coma
- Significant vision impairment
- Entered into psychiatric hospitalization, discharged after 2 days due to lack of participation
- Denial of deficits, “no problems”
- Returned to substance use prior to entering into rehab program



# Larry's Rehab

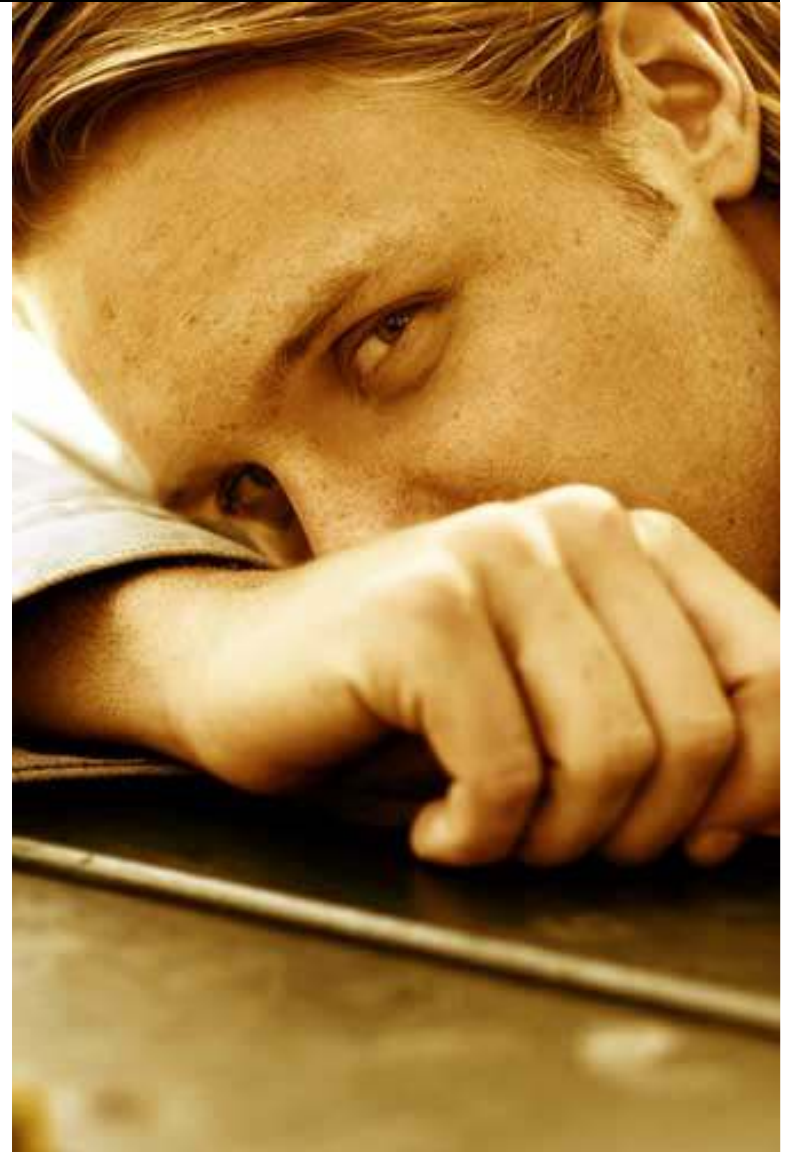
- Entered into detox, then TBI rehabilitation
- Continued to deny deficits related to injury
- Pulled parental conflict into rehabilitation
- Stabilized behaviorally and participated in rehab following several family interventions





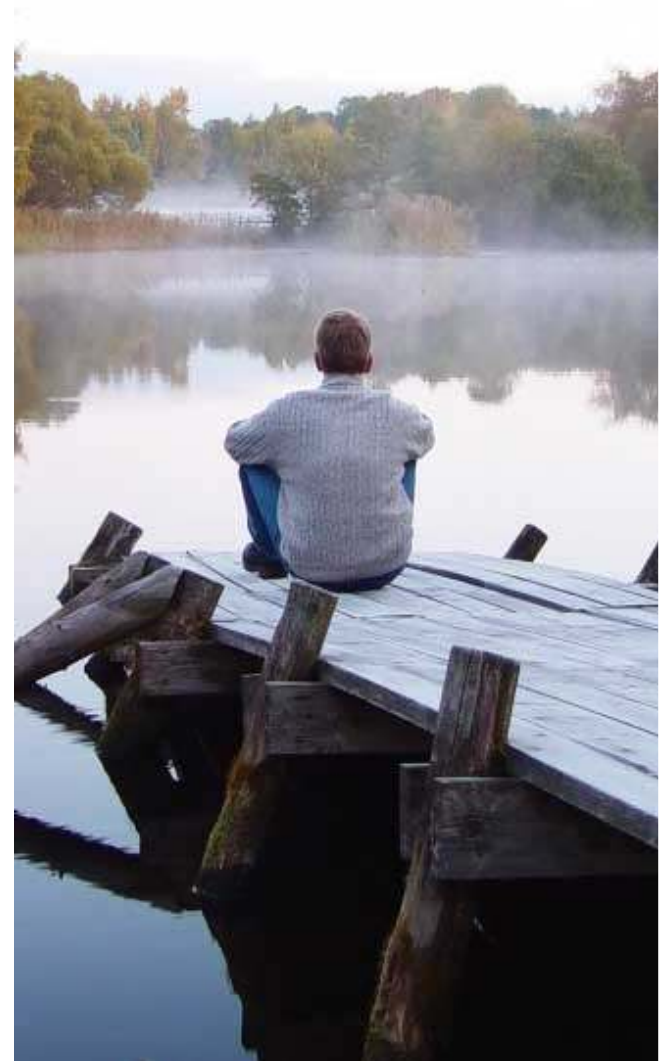
# Larry's Outcome

- Completed rehabilitation
- Returned to living with mother, entered into positive relationship with father
- Returned to university with educational/ cognitive supports
- Maintained abstinence



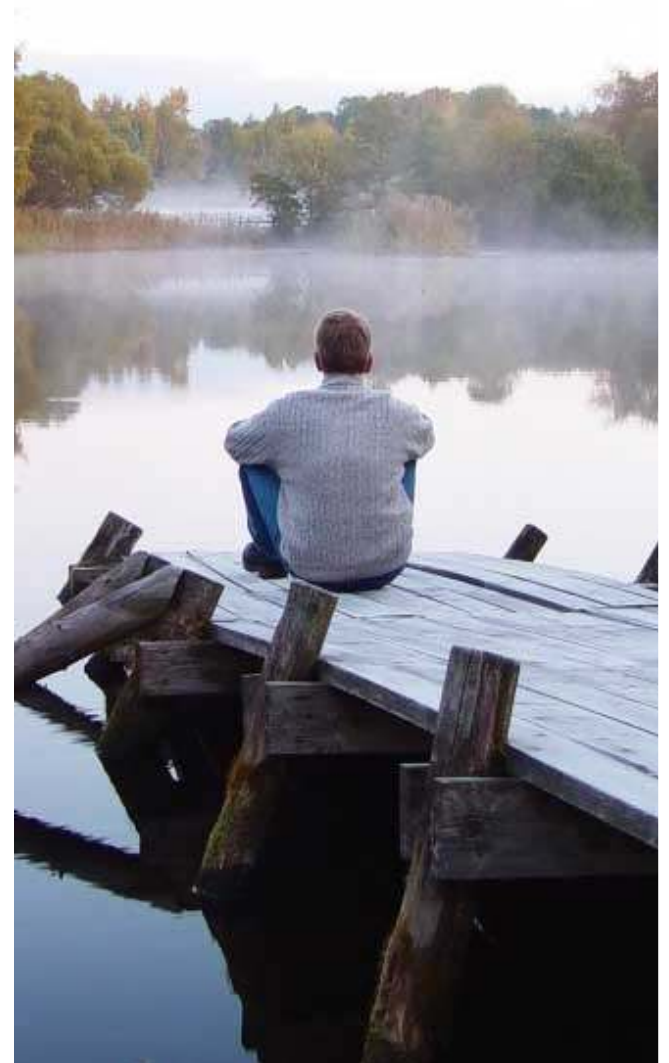
# Profile: Vic

- 41 year old with history of two brain injuries
- History of learning disabilities, adjustment difficulties and substance abuse problems
- “Acting out”, anti-social individual
- Multi problem family
- Limited support network



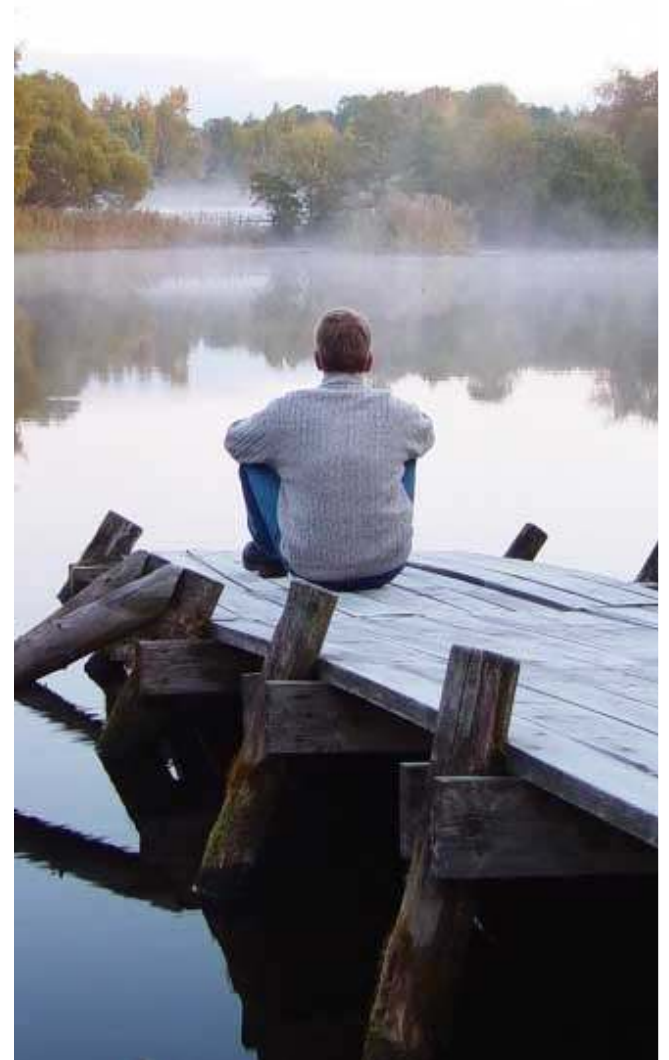
# Vic's Injury

- First injury at age 25 was an anoxic injury related to a self-inflicted gunshot wound to abdomen in suicide attempt
- Second injury was at age 34 following auto accident in which he “ran” a police road block. Ejected from vehicle
- Severe motor, cognitive and behavioural issues



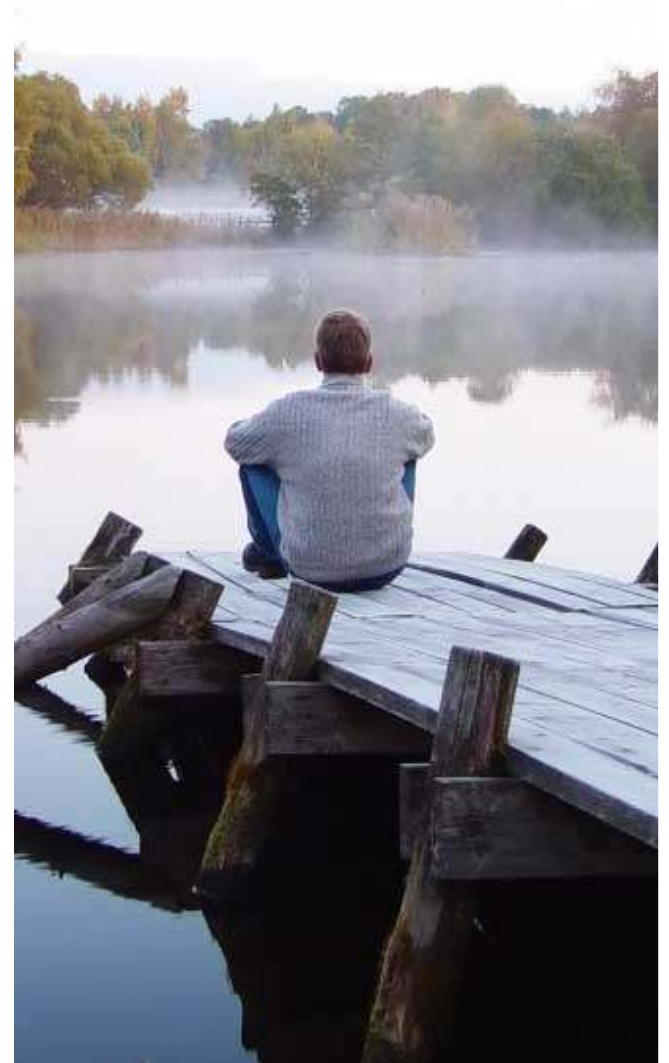
# Vic's Rehab

- No rehabilitation was provided/available following the first injury
- Second injury resulted in several months of medical care for multiple injuries followed by psychiatric hospitalization(s)
- Entered into neurobehavioural rehabilitation program five years post injury due to ongoing behavioural issues



# Vic's Outcome

- Reduced aggression, improved social skills and compliance
- Required much physical support to perform independent living activities due to physical disabilities and fatigue
- Severe memory problems prevented a return to independence



# Profile: Jill

- 32 year old divorced female, university graduate, instructor at university
- Attending graduate studies abroad
- Youngest of three children, raised by maternal grandmother
- Likelihood of depressive illness with childhood suicide attempt (age 7)



# Jill's Injury



- “Jumped” from auto following relationship crisis
- Multiple skull fractures, epidural and subdural hematomas
- Vision and hearing impairments
- Prolonged state of agitation and confusion
- Ongoing depression and social withdrawal
- Obsessive Compulsive Issues

# Jill's Rehab



- Six months of acute rehabilitation with neuropsychiatric consult for depression
- Five months of community based, supported living program with focus on independent living skills, social integration and self management
- Ongoing medical management of depression and participation in counseling



# Jill's Outcome

- Required high structure and support in transitional program due to cognitive problems
- Obsessive thinking
- Social withdrawal and isolation
- Articulated suicidal ideation in the course of her rehabilitation



# Outcome Observations

- Pre injury disorders related to mood regulation, impulse control and depression influence rehabilitation outcome
- Substance abuse treatment and psychiatric care must be included in rehabilitation
- Factors related to the suicide attempt cannot be neglected in rehabilitation
- Transitions in rehab and life “trigger” stress
- Family issues must be addressed
- History of prior attempts, ideation and thinking



# Post Injury Deficits and Long Term Outcome Issues

- Cognitive deficits can interfere with use of psychological and behavioural strategies
- Impulse control problems will hinder the generalization of self-regulation and the integration of behavioral alternatives
- Denial of deficits can stall meaningful change in behaviour and participation in rehabilitation



# Risk Management Issues

- Impulsive behaviours, judgment and “thinking” problems can support risk behaviours
- “Getting stuck” with a resolution to a problem
- “New problems” and “old solutions”
- Professionals, family and support network able to recognize risk and prevent harm



# Assessing Risk for Suicide

- Hopelessness: no available alternatives
- Suicide Ideation: thoughts, plan and method
- Negative Self-Evaluation: feelings of worthlessness, depression, despair
- Hostility: anger towards self and others
- Source: Suicide Probability Scale (SPS), Cull and Gill, 1982



# Past Attempt = Current Risk

- Risks associated with a call for attention via self-harm
- “Stuck” thinking, inflexibility may enhance risk potential
- Unresolved emotional/psychological issues
- Psychological and/or physical pain, despair over current life situation
- Impulsive behaviours



# Maintaining Outcome Durability




- Incorporate behavioral health and substance abuse treatment into the rehabilitation program
- Identify and use community support programs to extend treatment and to create the transition for discharge
- Train the individual, their support system and involved others to identifying behavioral health “red flags”
- Assure that the transition from rehabilitation to greater independence maintains appropriate resources and safeguards

# Implications for Rehabilitation

- Individuals with a TBI related to a suicidal attempt will require services outside of the traditional TBI model
- Issues of pre-injury psychiatric and/or substance abuse problems will enter into the rehab setting
- The effects of the brain injury will influence how the individual will address their mental health issues and determine what accommodations must be made
- Clinical risk assessment and management will need to be maintained throughout rehab



# When Suicide is the Cause of Brain Injury: Implications for Rehabilitation

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