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Managing Brain Injury - from Diagnosis to Recovery - Concurrent Workshop Repeated

Saturday, 22 June 2013

Start 2:00pm

Duration: 55mins

Sigma

Start 3:05pm

Duration: 55mins

Sigma



Rotorua GP CME 2013

NZMA
New Zealand Medical Association

General Practice Conference & Medical Exhibition

20-23 June 2013 | Energy Events Centre | Rotorua

Managing Brain Injury – From Diagnosis to Recovery

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- What exactly is the brain having difficulty with in terms of cognitive function?
- What are the practical day to day issues facing the doctor managing a patient recovering from a brain injury?
- Questions/issues to discuss

Issues managing patients with TBI

- Judging the severity of the injury, especially at the mild end of the scale.
- How long should the recovery take?
- What can you do to aid recovery?

Issues

- Judging the severity of the injury.
 - Important and needs to be done as soon after the injury as possible.
 - Use all information.

Issues

- How long should the recovery take?
 - Pre-existing conditions – esp migraine/ headache, mood and personality issues, chronic pain and fatigue issues.
 - Previous TBI – number of injuries, severity, duration of symptoms, timing of injuries.
 - If the recovery is very prolonged, possibly review the injury, was it possibly more severe.

Issues

- What can you do to aid recovery?
 - Referral to concussion service?
 - Is the rehabilitation input aiding or slowing the recovery?
 - Are there other issues that are affecting the recovery that need to be dealt with?
 - Decisions regarding return to work.

Issues

- What can you do to aid recovery?
 - Referral to concussion service?
 - direct referral rather than to ACC
 - If the patient has known pre-existing headache and mood issues, state whether an active issue at the time of the injury
 - Objective assessment via neuropsychological screening assessment
 - If injury more than 1 year old, refer to ACC directing clearly the input you feel is needed.

Concussion symptoms

Headache

Fatigue

Cognitive problems

Irritability/ mood
swings

Sleep disruption

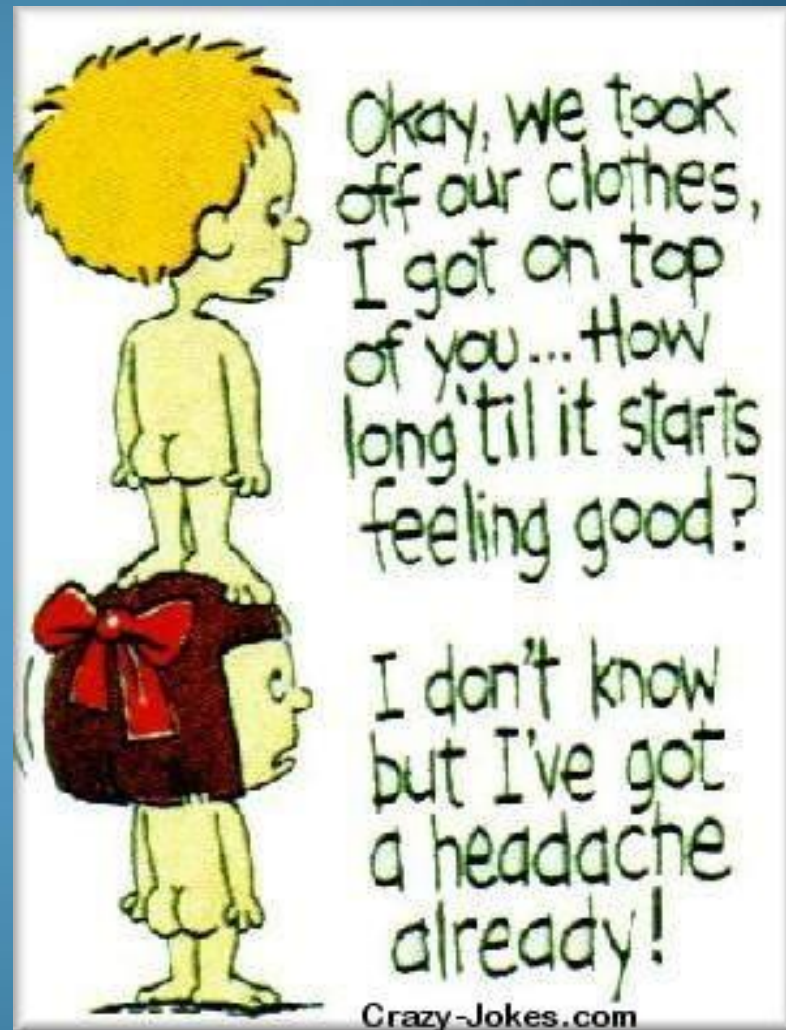
Lightheadedness

Nausea and vomiting

Dizziness

Light and noise
sensitivity

Tinnitus



Treatment and Recovery

- Rest
- Pacing activities
- Avoid alcohol
- Medical treatment of headache and sleep disruption.

Post Traumatic Headache

- Make the diagnosis of headache type based on the standard classification and treat appropriately for the type of headache.
- Is the course of the headache recovery progressing as expected?
- Look at other concussion symptoms in making medication decisions eg. sleep issues.
- Watch for medication overuse exacerbation of headache.

Sleep Issues

- Usually onset insomnia and waking in the night.
- Overall more or less sleep than usual.
- Daytime fatigue and rest/sleep.
- Medication:
 - Short term use of hypnotics
 - Melatonin
 - Tricyclic antidepressants

REMEMBER THE
GOOD OLD DAYS WHEN
WE PLAYED SPORTS
AND NEVER WORRIED
IF WE GOT CONCUSSIONS?



In the Bleachers © 2012 Steve Moore. Dist. by Universal Uclick



www.gocomics.com/inthebleachers

NO.



Moore
2/21

Cognition

- Attention
- Information processing
- Memory
- Executive functions

Cognition - Attention

- Ability to focus on certain aspects of the environment that one considers important or interesting.
- *Concentration* is sustained attention.
- *Selective attention* is filtering out irrelevant information.
- *Divided attention* – split attention between stimuli, multi-tasking

“If women are so bloody perfect at multitasking,
how come they can’t have sex and a headache
at the same time?”

Billy Connolly

Cognition - Attention

- Ability to focus on certain aspects of the environment that one considers important or interesting.
- Concentration is sustained attention.
- Selective attention is filtering out irrelevant information.
- Divided attention – split attention between stimuli, multi-tasking
- Attention can operate on a *conscious* or *automatic* level.

Cognition - Attention

→ Attention underlies all other cognitive skills as without it information does not make it into the brain to be processed and stored and utilised.

Cognition – Attention after Brain Injury

- Attention disorders are recognised as one of the most common problems associated with brain injury, even after mild injury.
- Pre-injury automatic skills tend to require greater conscious control.

Cognition – Attention after Brain Injury

- Easily distracted
- Difficulty concentrating for long periods
- Dealing with more than one thing at a time
- Attention wanders easily
- Slowness in responding
- Need prompting to get on with things
- Spend time daydreaming
- Mentally tired more easily
- Missing important details in tasks
- Feeling restless
- Losing track mid-conversation
- Feeling spaced-out or blank
- Jumping from one task to another without completing any

Cognition – Information Processing

- Information processing is the way we make sense of the world, decoding it in our brain, dealing effectively and efficiently with the sensory information constantly entering the system.
- Capacity of thinking – amount of information/time
- Speed of thinking – how quickly information is processed
- Control of thinking – directing and organising processing capacity

Information Processing after Brain Injury

- Reduced speed, capacity and control of information processing commonly occur even after mild injury.
- One of the most pronounced problems as this deficit underlies many of the cognitive functions.

Information Processing after Brain Injury

- Having to do things slowly to understand them
- Difficulty with “thinking on your feet”
- Dealing with crowds, noisy places, young children
- Understanding complex instructions
- Following fast moving conversations
- Completing tasks quickly
- Going off on tangents in conversation
- Understanding new information
- Difficulty doing things in a busy, noisy environment

Cognition - Memory

- Pre-requisites to memory are attention and the ability to process information.
- *Short term memory* – held long enough to use it.
- *Long term memory* – safely stored as long as you know where you put it!
- *Working memory*= short term memory=notebook

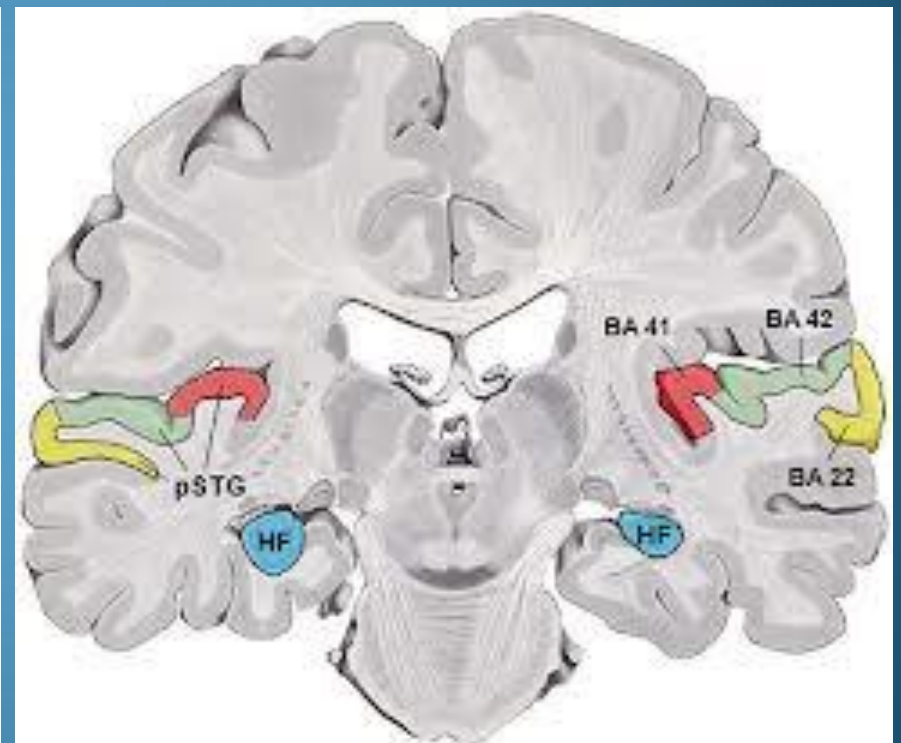
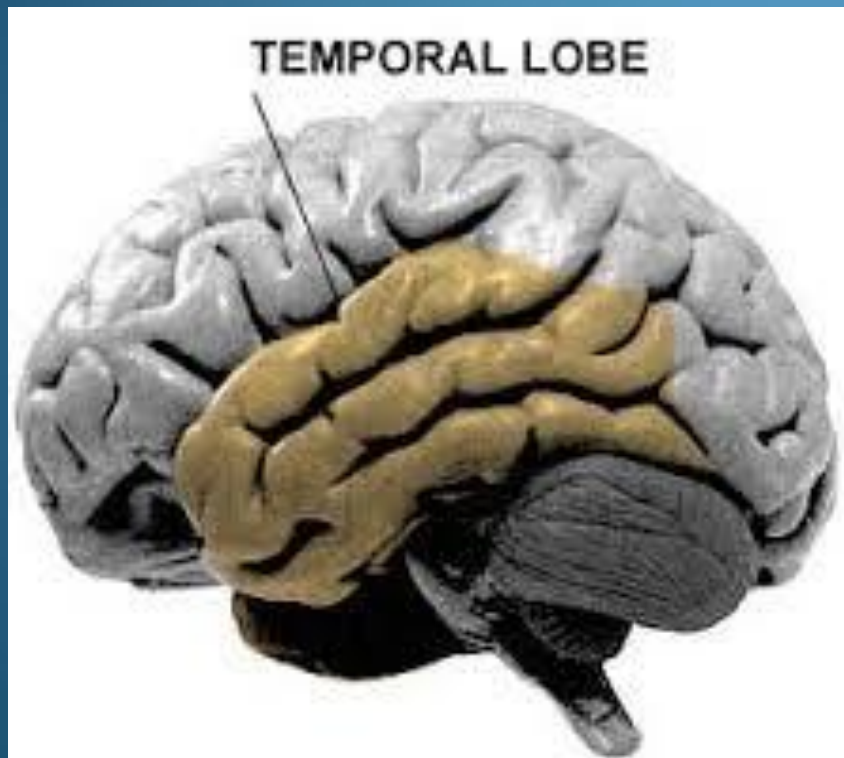
Cognition - Memory

- Memory is a dynamic, multistage cognitive activity.
 - *Attending* to the information
 - *Encoding* is registering the information/ depth of processing
 - *Storage* – in long term memory
 - *Consolidation* – practise
 - *Retrieval* – cued recall or recognition.

Cognition – Memory in Brain Injury

- Commonly problems with retrieval due to difficulties with attention and encoding.
- Can be helped with therapy and learning strategies.
- More permanent memory issues with damage to the temporal lobes.

Memory – Temporal lobes and Hippocampi



Cognition – Executive Functions

- The brain's management executive plus personal assistant.
- Executive functions enable us to accomplish goal directed activity.
- Control our behaviour so that it is appropriate to the situation.

Cognition – Executive Functions

- Self-awareness
- Goal setting
- Self-initiation
- Self-inhibition
- Planning and organising
- Self-monitoring and self-evaluation
- Flexible problem solving

Executive Functions in Brain Injury

- A major problem!!
- The majority of brain injuries involve the frontal lobes.
- Executive functions are controlled by the frontal lobes.
- Huge impact on an individuals ability to function independently at work or socially.
- May appear lazy or unmotivated.
- May superficially appear normal in conversation and manner.

Executive Functions in Brain Injury

- Difficulty in identifying strengths and weaknesses
- Seeing the consequences of actions
- Planning and executing a sequence of behaviours
- Confusion when faced with choice
- Difficulty in generation of ideas
- Inappropriate in behaviour and conversations
- Preoccupation with irrelevant and trivial matters
- Rigid, inflexible thinking and behaviour
- Chaotic and disorganised approach to tasks
- Limited transfer of information to novel situations

Psychosocial Consequences

- Change in personality.
- Irritability.
- Socially withdrawn, anxious, depressed.
- Impulsive behaviour.
- Substance abuse.

Consequences of Repeated Injuries

- Cumulative effect of repeated injuries.
- Under-recognised effects of multiple mild or moderate injuries.
- Incidence and outcomes of traumatic brain injury and substance abuse in a New Zealand prison population.

Brain Injury 1998 Jun:12(6);455-466

- 86.4% of the 118 respondents had sustained a traumatic brain injury with 56.7% reporting more than one.
- Maori reported 12% more TBI.

Thank you



Types of TBI severity (WHO classification)

- Mild
 - GCS 13-15 and/or PTA <24 hours (losing consciousness [even few seconds], seeing stars, being dazed or confused after a head injury is highly suggestive of mild TBI)
- Moderate
 - GCS 9-12 and/or PTA 1-6 days
- Severe
 - $GCS \leq 8$ and/or PTA 7 days or more

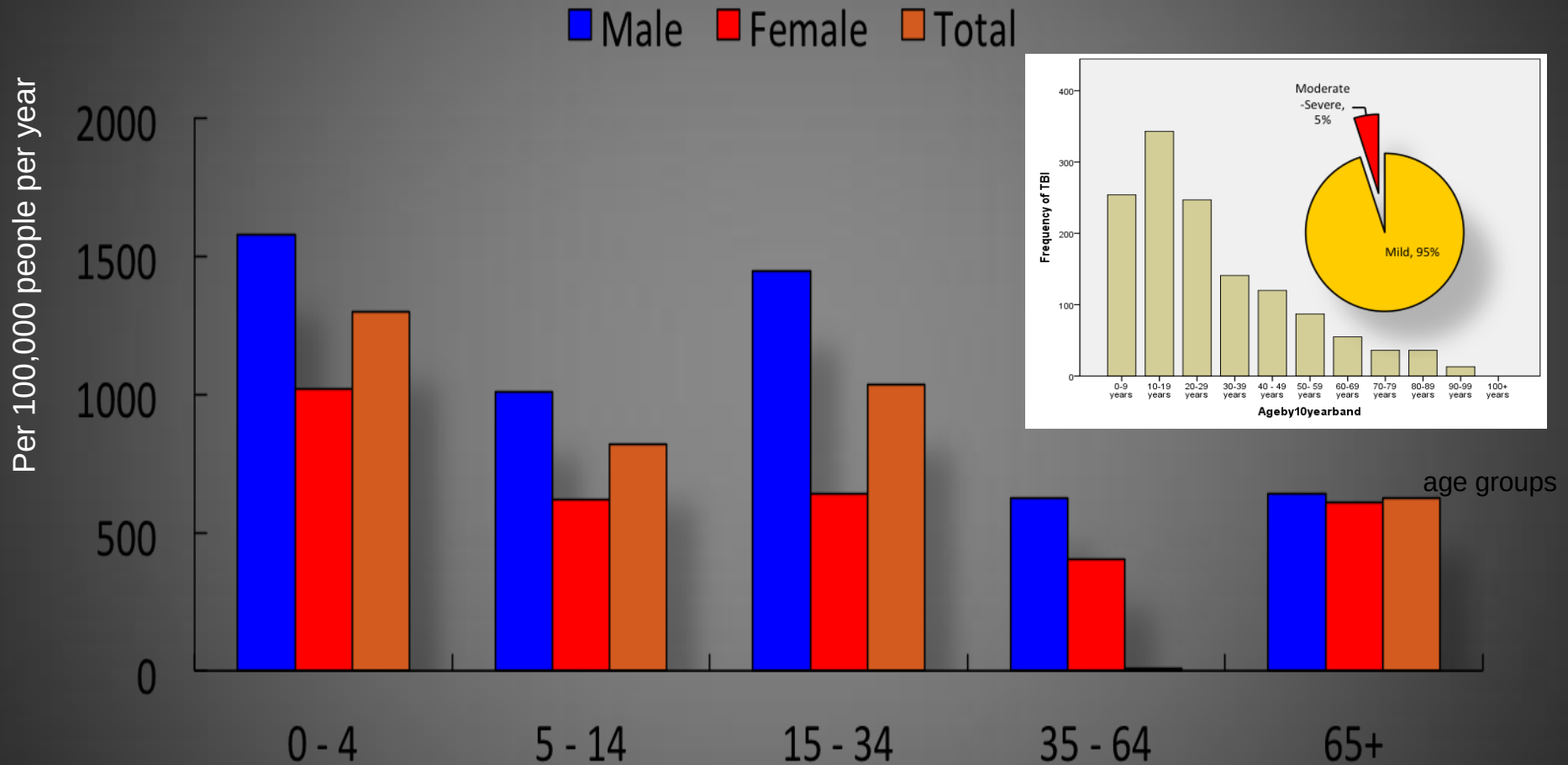
TBI incidence study (BIONIC) in NZ*



- 170,000 residents (100,000 urban) largely representative of NZ: NZ Europeans – 63%, Maori – 20%, Pacifica – 2%, other – 15%
- Study period: 2010-2012
- TBI cases across all ages and TBI severity in both rural and urban population, hospitalised and non-hospitalised, fatal and non-fatal (1369 TBI cases identified between 1 March 2010 and 28 February 2011), follow-up all cases for major outcomes at 1, 6 and 12 months – the largest and most comprehensive epidemiological study of TBI in the world
- Standard TBI definition, outcomes
- HRC funded, 25 research staff involved

*Feigin et al. *Lancet Neurology* 2012

TBI incidence rates in NZ*



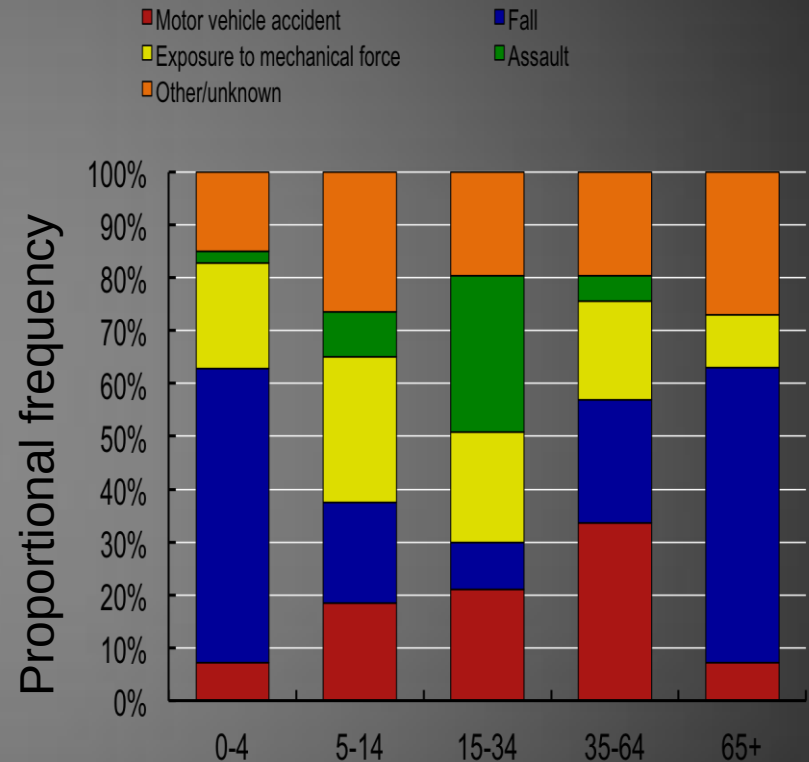
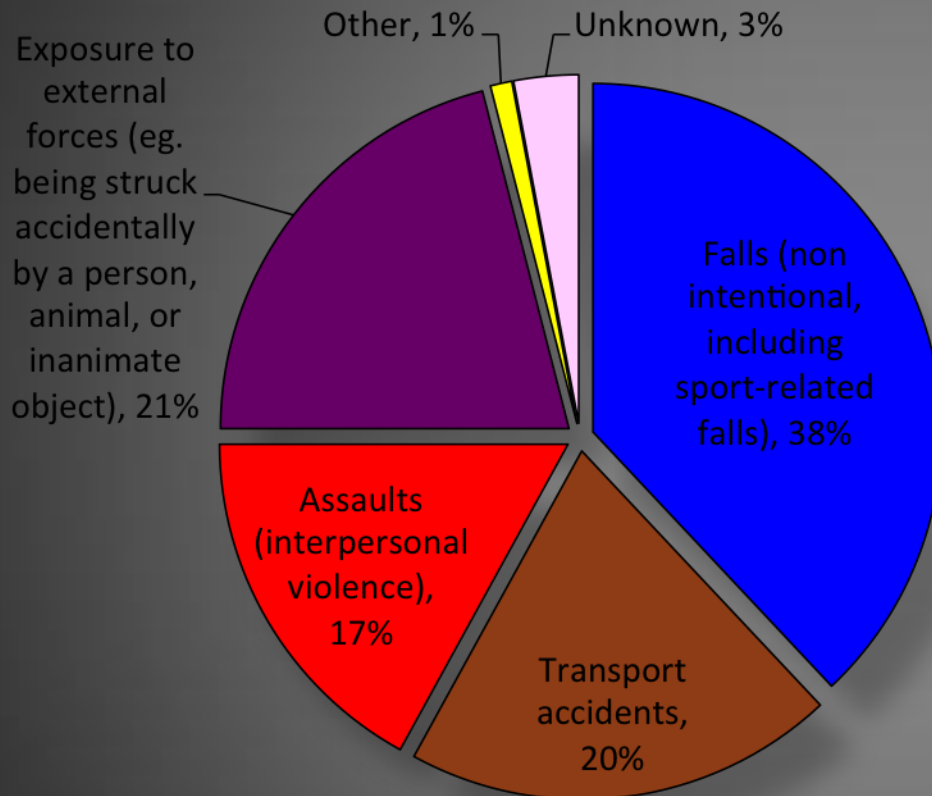
*Feigin et al. *Lancet Neurology* 2012

TBI incidence rates in NZ*

- TBI incidence in NZ (790/100,000) is far higher than in other developed countries (47-618/100,000)
- In NZ, there are some 36,000 new TBI every year (one new TBI every 15 minutes) – far more than number of new strokes or heart attack. Likely estimated costs to the country – billions of \$
- The risk of sustaining moderate-severe TBI in the rural population is almost 2 times greater than in the urban population
- Males - 62% of all TBIs, children and young adults (0-34 years) – 69% of all TBIs
- Mild TBI – 95% of all TBIs (significantly more than previously estimated)
- About 36% of people with mild TBI are never admitted to a hospital

*Feigin et al. *Lancet Neurology* 2012

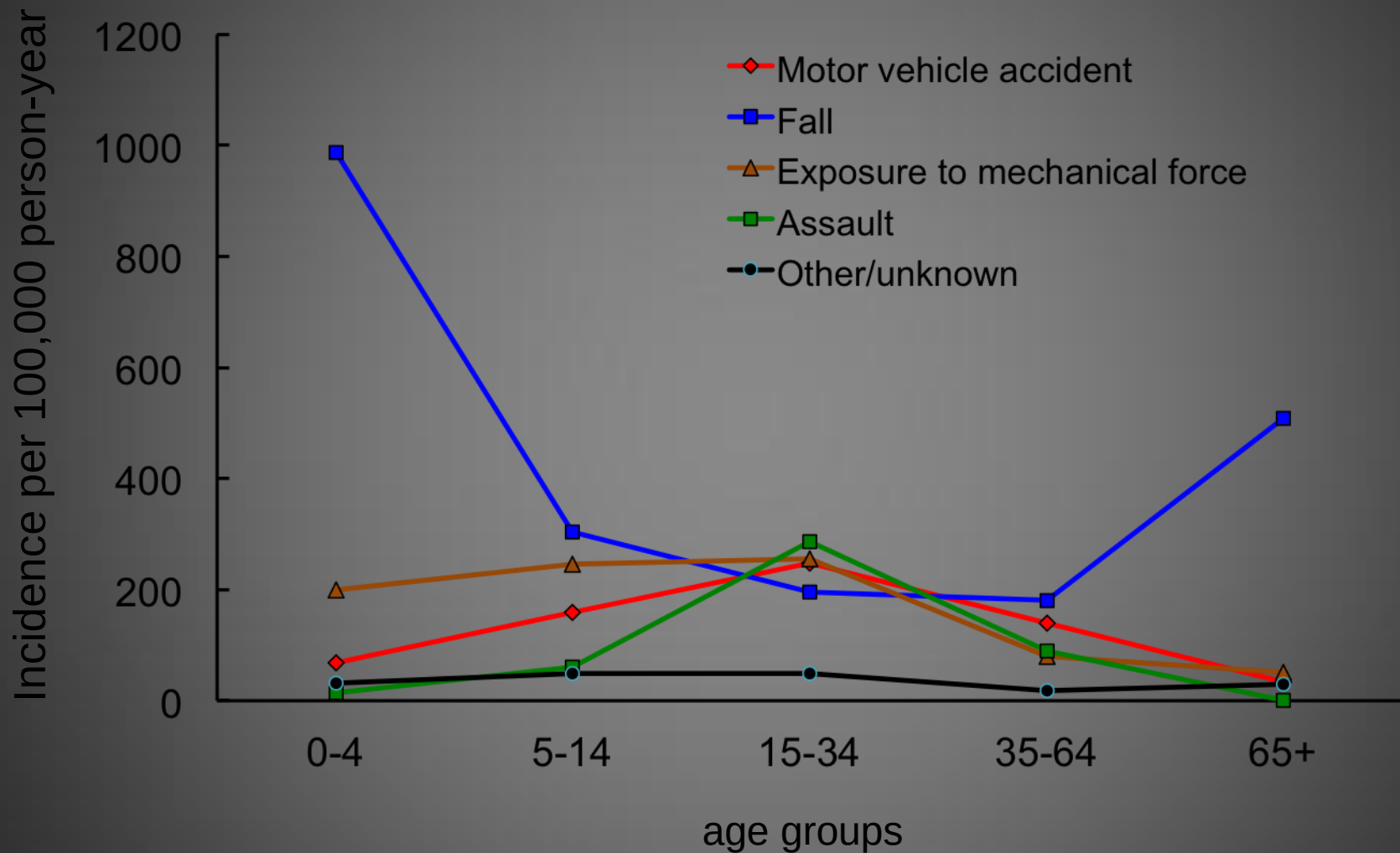
Mechanisms of TBI in NZ*



- Falls are the leading cause of TBI in NZ (not transport accidents as previously thought)
- The proportion of TBI due to assaults in NZ (especially in Maori) is far greater than in other populations

*Feigin et al. *Lancet Neurology* 2012

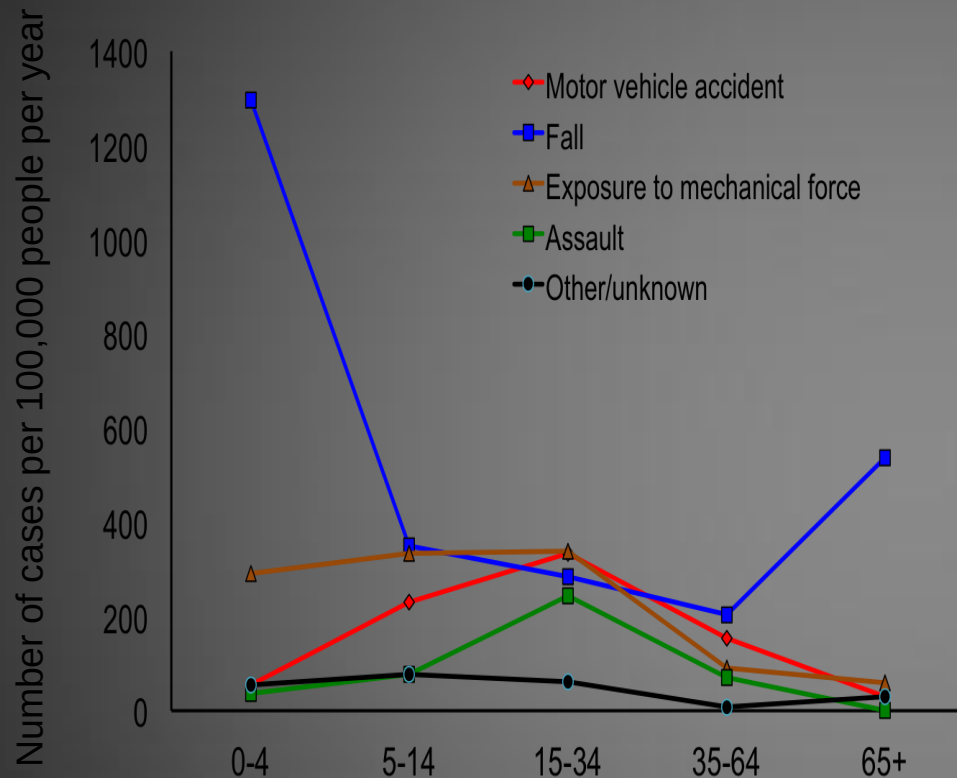
(A) Age-specific incidence of TBI by mechanism of injury



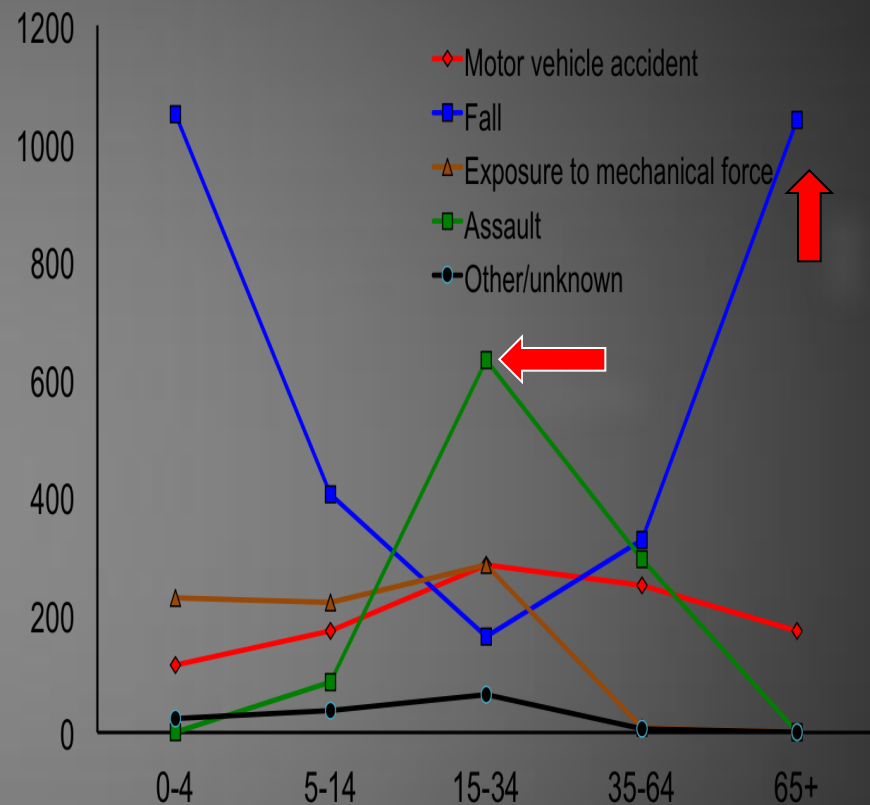
*Feigin et al. *Lancet Neurology* 2012

Age-specific incidence of TBI in NZ by mechanism of injury and ethnicity

Europeans



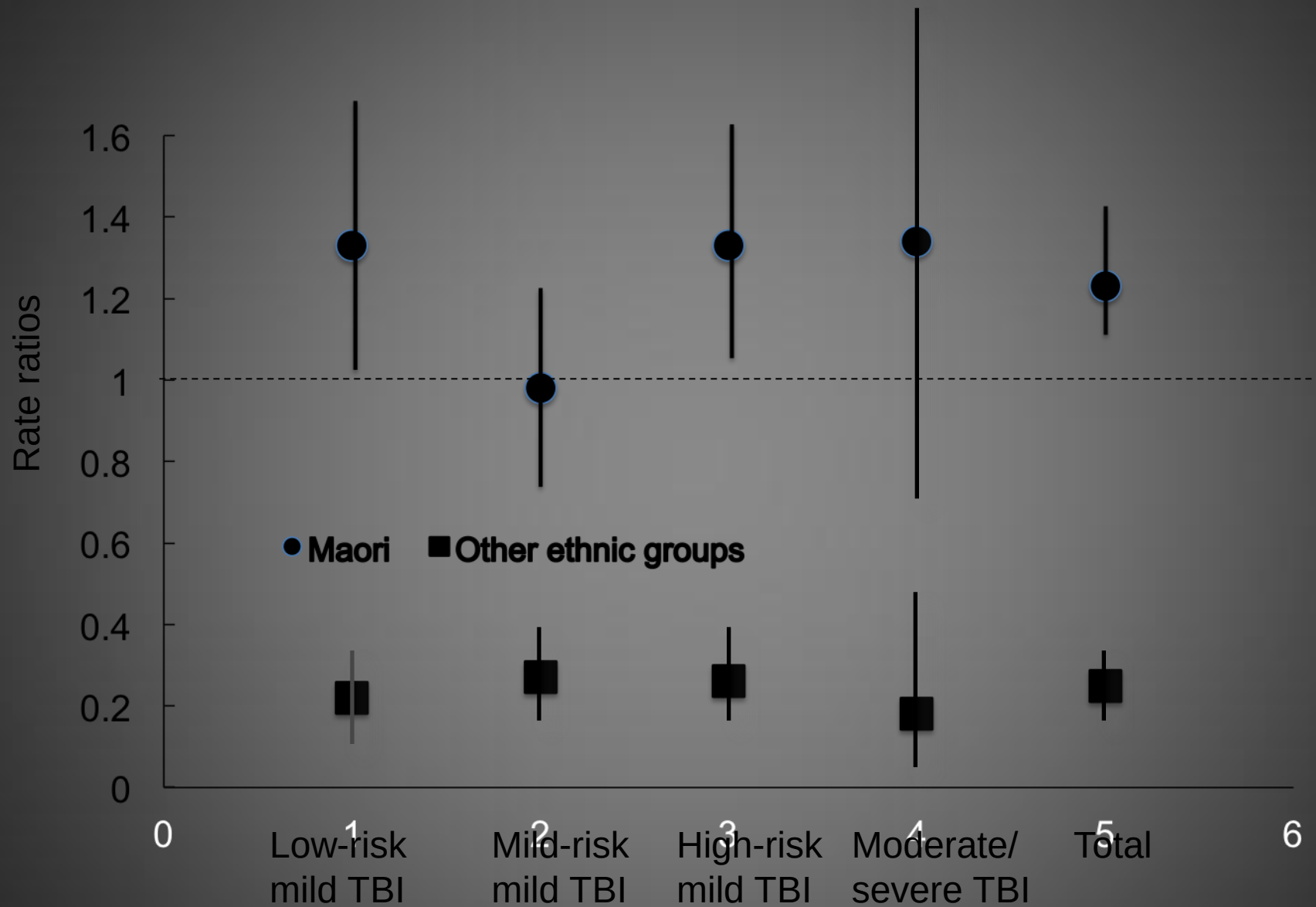
Maori people



age groups

*Feigin et al. *Lancet Neurology* 2012

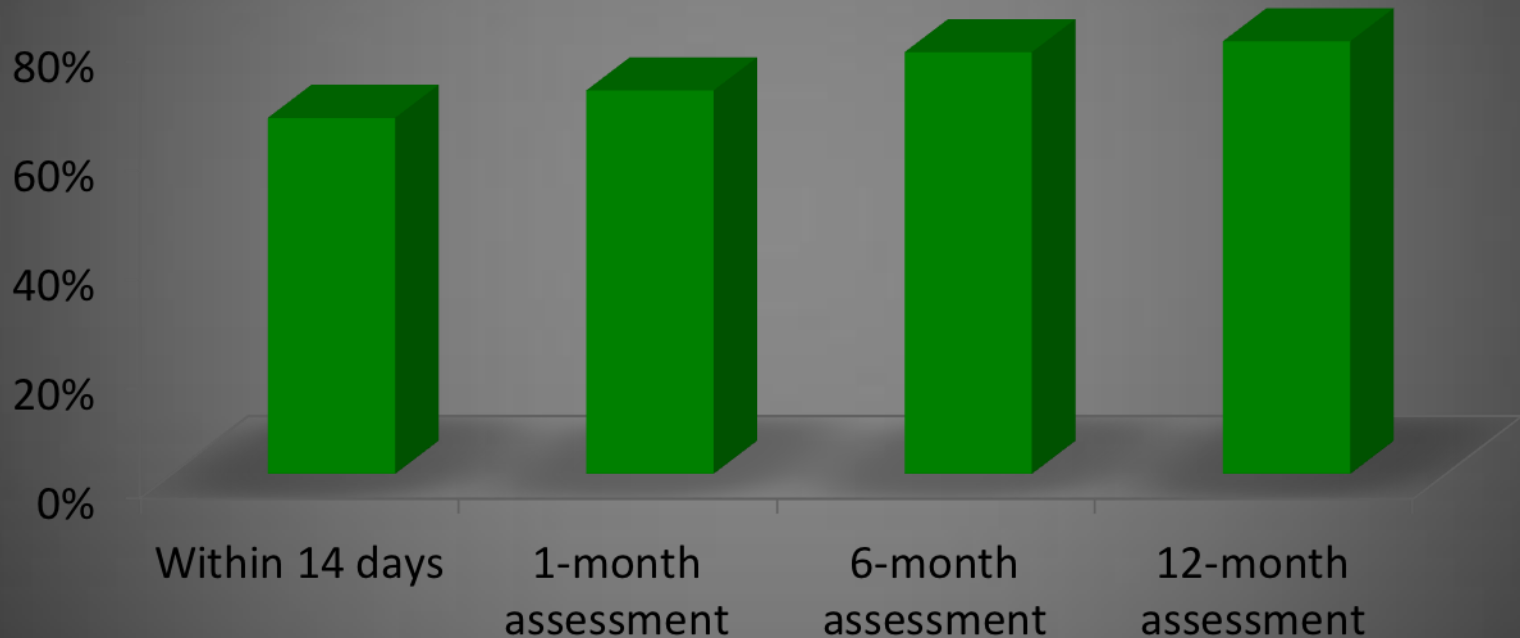
Rate ratios of TBI incidence by ethnicity (NZ Europeans as a reference group)



*Feigin et al. *Lancet Neurology* 2012

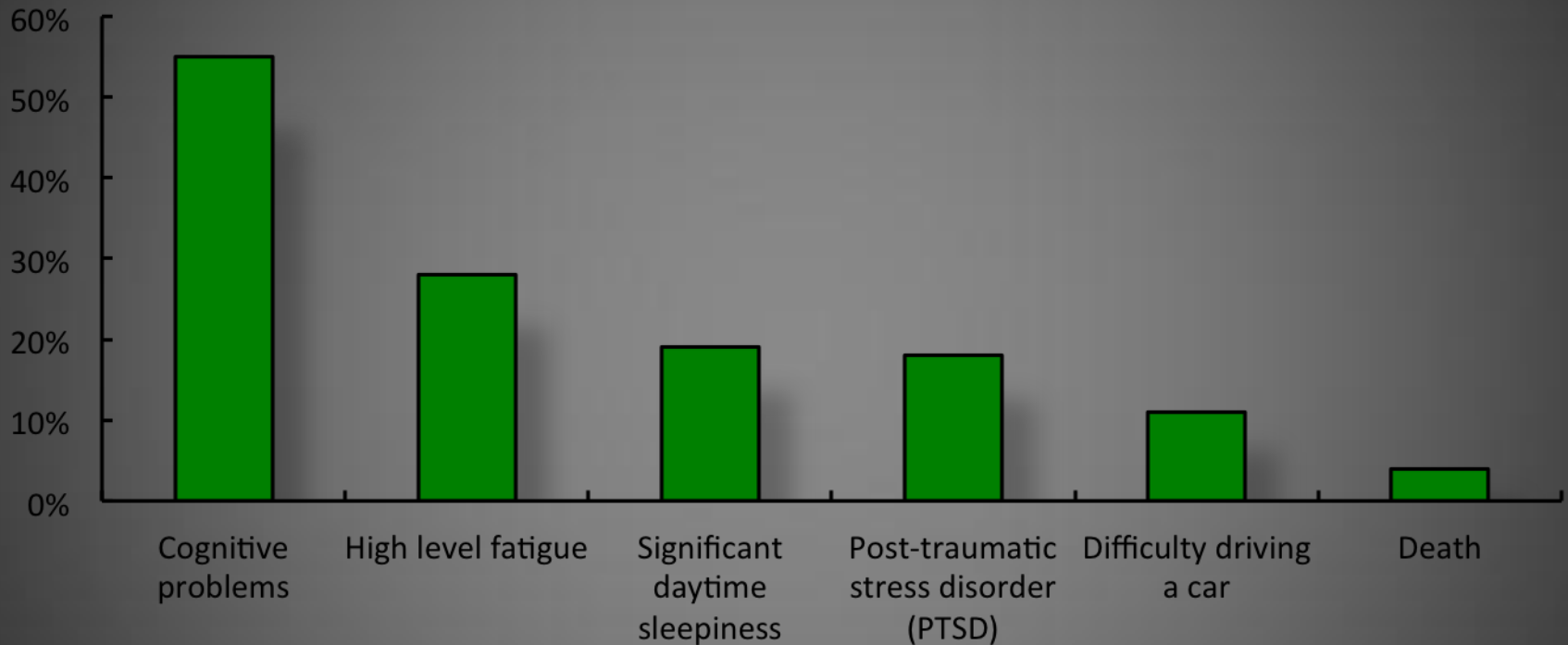
Return to work after TBI*

(among those 56% who were employed pre-TBI)



*BIONIC unpublished data

Persistent difficulties at 12-months post-TBI*



Predictors of PTSD (intrusive recollection/re-experiencing of the event (e.g., dreams, flashbacks); avoidance of stimuli associated with the trauma and numbing of general responsiveness; and persistent symptoms of increasing arousal (e.g., difficulty sleeping, irritability, difficulty concentrating): female gender, increased LOC and intentional injury

*BIONIC unpublished data

Other persistent problems post-TBI

- Personality change
 - impaired social perceptiveness, impaired self-control, aggression/irritability, affective lability/instability or apathy, inability to learn from social experience): in up to 70% people post-TBI
- Persistent Post Concussive Symptoms
 - headache, dizziness, sleep disturbance, fatigue, irritability, poor concentration, forgetfulness, blurred vision): in about 40% post-TBI

Other persistent problems post-TBI

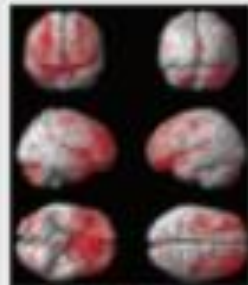
- Prevalence of mood disorders (e.g. depression, anxiety) post-TBI is about 30-50%
- The risk of any psychiatric illness post-TBI is 3-4 times greater than in those without TBI
- Post-TBI seizures: 1% in mild TBI, 12% in moderate-severe TBI
- Second impact syndrome (profound, often fatal brain swelling after sustaining new TBI happens when symptoms from initial TBI are not subsided)

Long-term consequences (dementia, chronic traumatic encephalopathy, Parkinson's disease)

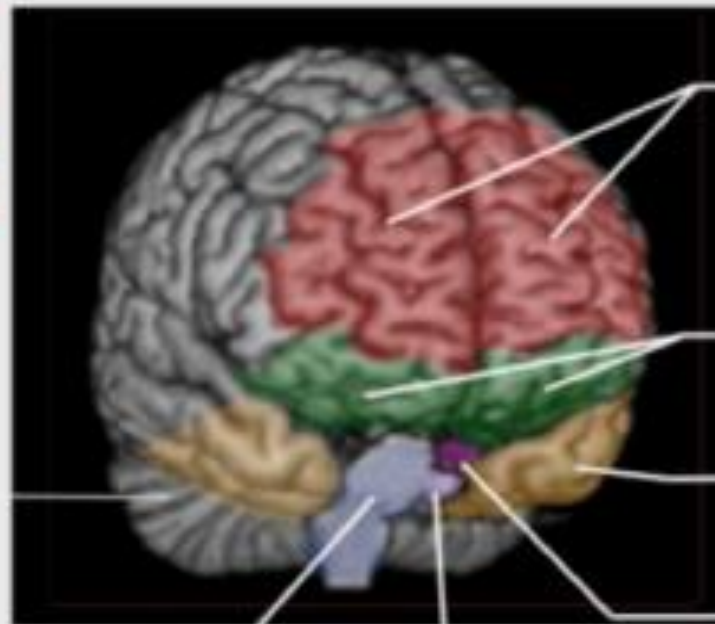


- Even minor hits to the head (without loss of consciousness) on a regular basis (e.g. soccer players) may lead to long-term brain damage with thought and memory problems (N Marchi et al. PLOS 2013)

Brain regions vulnerable to TBI and relationship to neurobehavioral sequelae



A



B

Dorsolateral prefrontal cortex

(executive function, working memory, sustained and complex attention, memory retrieval, abstraction, judgement, insight, problem solving)

Orbitofrontal cortex

(emotional and social responding, social comportment)

Temporal polar cortex

(memory retrieval, sensory-limbic integration)

Amygdala

(emotional learning and memory, fear conditioning)

Entorhinal-hippocampal complex

(declarative memory, sensory gating, attention)

Ventral brain stem

(arousal, ascending modulatory neurotransmitter systems)

Cerebellum

(coordination, working memory, mood regulation)