

Pediatric Traumatic Brain Injury Life Care Planning

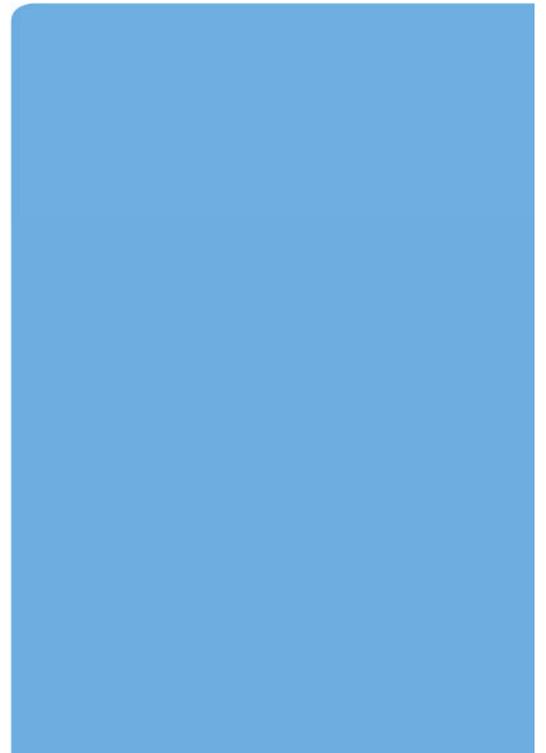
Jacob A. Neufeld, MD, MSPH

St. Luke's Children's Hospital

Boise, Idaho

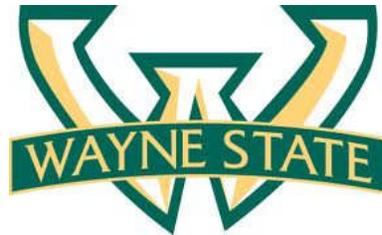
Pediatric Rehabilitation Medicine

<https://www.youtube.com/watch?v=Fvy4hHjpGb0>



Northwestern States







Life Care Plan

Dynamic Document & Process

- Medical Care(acute and chronic)
- Changing Development of the Child
- Changing family dynamics



Collaborative Effort

- Physician and Life Care Planner
- All members of treatment team
 - PT/OT/SPEECH/MD/DO/Nurse/SW/Teacher/Family
- Combined evaluation
 - In home if possible
 - In School observation



United States

- 2.5 million TBI
- 2.2 million treated in ER
- 280,000 admitted
- 50,000 deaths

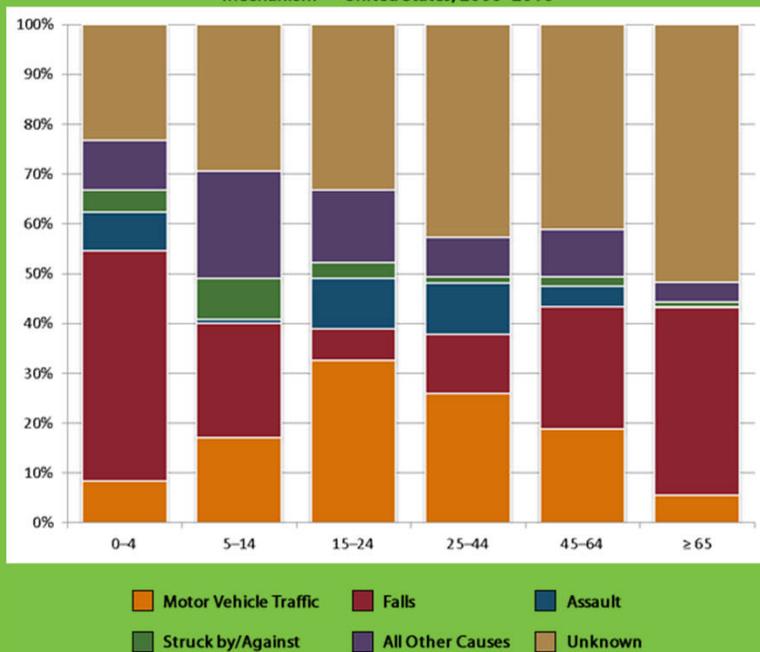


Incidence of Acquired TBI

- 148-270 per 100,000 all males(2:1)
- 70-116 per 100,000 all females(1:2)
 - Concussions/TBI of all severities
 - MVA/ Bicycle account for 50% injuries
 - Falls, assault, firearms, recreational activities
 - MVA 50% Alcohol Related

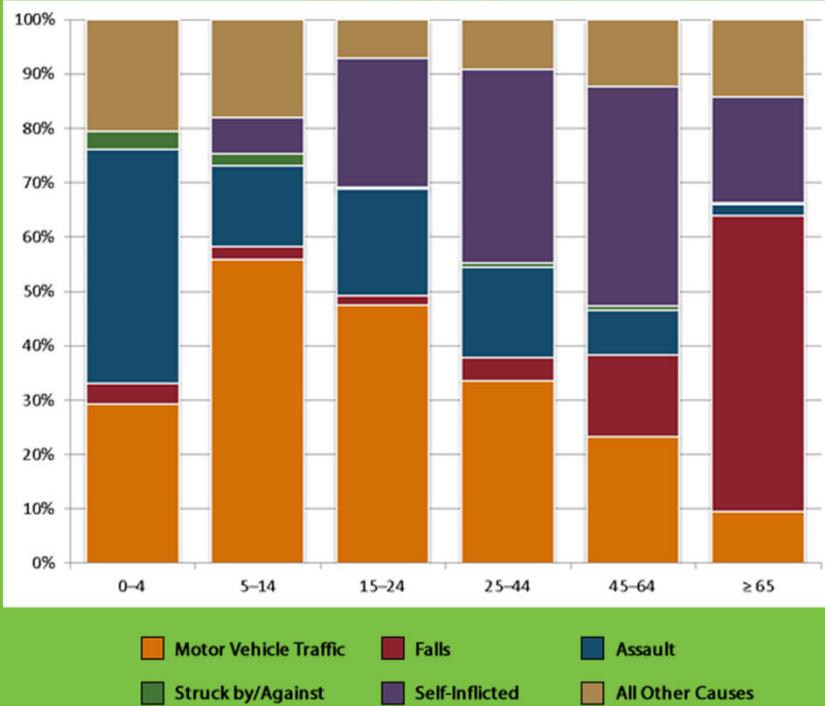
Mechanism

Percent Distributions of TBI-related Hospitalizations by Age Group and Injury Mechanism — United States, 2006–2010



Death by Age Group

Percent Distributions of TBI-related Deaths by Age Group and Injury Mechanism —
United States, 2006–2010





Firearm Suicide Deaths

- 41,000 total
- 21,000 self inflicted
- 57 per day
- 20-25% 5-25 yrs old





Homocide by Firearm



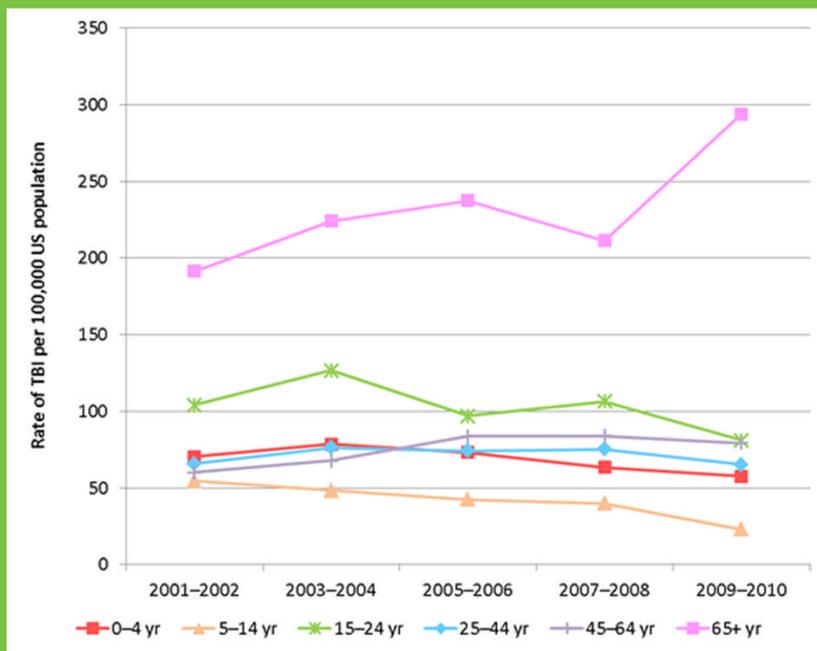
- 16,000 All
- 11,000 Firearms
- 30 per day





Rates *by Age Group*

Rates of TBI-related Hospitalizations by Age Group — United States, 2001–2010





Monetary Cost

- 76 Billion Annually
- Medical, lost wages, disability, etc
- 90% costs for severe TBI
- **MUST BE COMPREHENSIVE
REGARDLESS of Financial
Limitations**

Injury Severity

- GCS
 - < 8 severe
 - 9-11 moderate
 - 12-15 mild injury
 - 72 hr GCS
 - Time to GCS 6 or 15
- Verbal (in young children)
 - 5 smiles oriented to sound, follows objects interacts
 - 4 cries but consolable interacts inappropriately
 - 3 cries but is inconsistently consolable, moaning
 - 2 inconsolable crying, irritable
 - 1 no response



Associated Injuries

- 5-10% incidence of SCI
- Brachial plexus injuries, fractures, solid and hollow viscous injuries,
 - Many identified in the post acute setting.

Motor Deficits

- Diffuse injury
 - Heterogeneous population
- Focal brain injury
 - Hemiparesis
- Balance impairments
- Tremor
- Dystonia
- Spasticity
 - UMN lesion
- Rigidity
 - (hypoxia/ischemia)

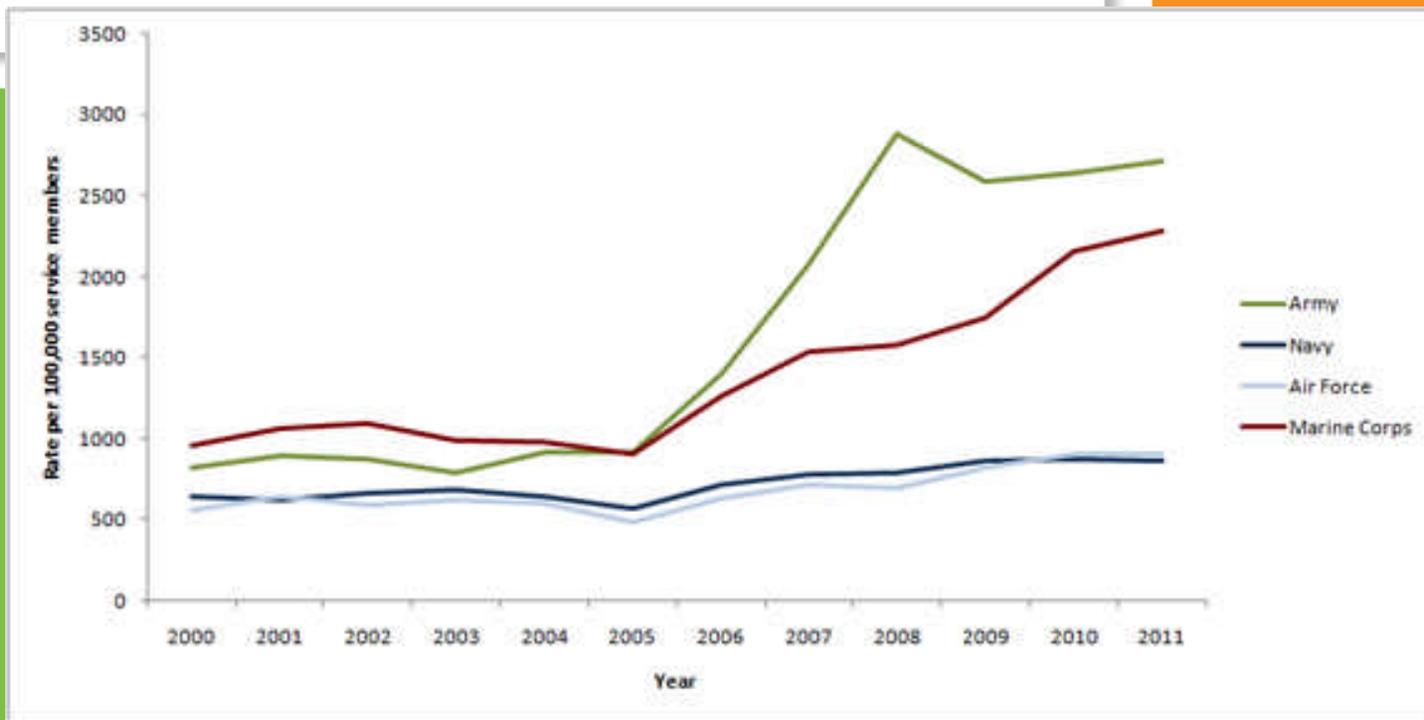
Sensory Deficits

- Anosomia
- Hearing impairment
 - Central processing deficit
 - Can coexist with cognitive impairment!
- Visual Impairment





US Military



Cognitive Deficits

- Largest cause of disability
- Constellation of sequelae
- Injury to developing brain
 - Associated learning difficulties
 - Delayed onset of disability and impairment

Cognitive Deficits

- Arousal and Attention
 - Attention: allows the individual to focus on the pertinent sensory stimuli and select which stimulus will elicit a response
 - Among most common deficits after TBI
- Attention involved in memory impairment
- Higher incidence of TBI among children with prior dx of ADHD

Cognitive Impairments

- Abnormal emotional expression
 - Initially lack of emotional expression
 - Later emotional lability
 - Inability to identify emotions in others
 - Social isolation
- Abstract reasoning
 - Very common
 - Egocentricity
 - Lack of insight



Cognitive Impairment

- Agitation
 - hyper arousal
 - More common with frontal lobe and subcortical lesions
 - Associated with more severe injuries
- Memory + learning
 - Correlates with severity of injury
 - Academic performance correlates with severity of injury

Cognitive Deficits

- Communication
- Up to 2/3 of inpatient rehab pts
 - 1/3 Dysarthria
 - Aphasia
 - Age of injury may influence ultimate language outcome
- Behavioral sequelae
 - Impulsivity
 - Disinhibition
 - Preschool injured children at higher risk for later behavioral problems which interfere with school performance



Academic Placement

- What kind of School Setting
- What kind of Support
- IEP
- Vocational Training
- Vocation Placement





Employability

- Yes/No
- Full/Part time
- Supervised
- Vocational Expert

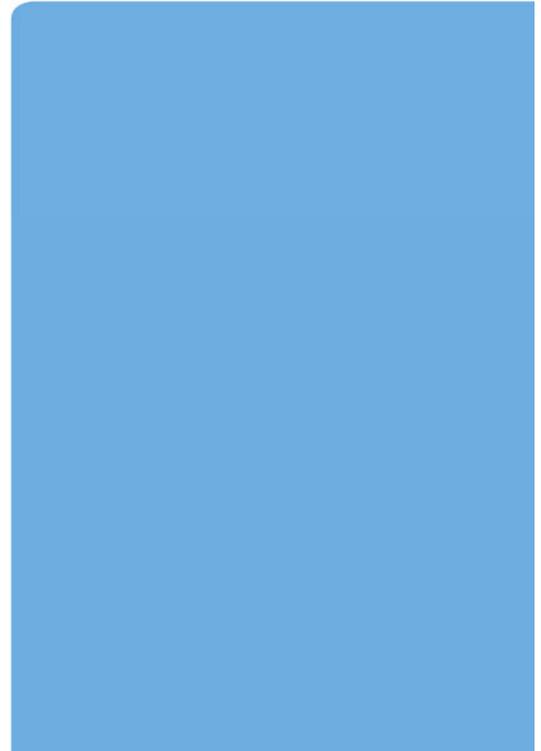
Medical Complications

- Neuroendocrine dysfunction
 - Diabetes insipidus
 - SIADH
 - Cerebral salt wasting
- Precocious puberty
- Delayed puberty
- Hypothalamic and pituitary disorders



Medical Complications

- GI hemorrhage
- Enteral feedings
 - GERD
- Bowel Management
- Bladder management
- Heterotopic ossification
- Post Traumatic Seizers
- Central Autonomic Dysfunction
 - Begins in acute period
 - Can persist for several months
 - Prenatal injury may predispose to lifetime symptomatology





Community Reintegration

- In-Out of home services
 - 24hr supervision/care/respice
- IEP
 - Dynamic tool
- Return to sport/recreation



Attendant Care

- Child
- Adolescent
- Adult
- Hours
 - 24/7
 - School
 - Night time



Therapy Service

- Physical
- Occupational
- Speech
- Recreational
- Behavioral
- Family
- DURATION & FREQUENCY ???????



Equipment/Supplies

- Wheel Chair
- Gtube
- Medications
- Frequency/duration



Life Expectancy

- Duration and Frequency
- Damages
- No specific actuarial life tables
- Education/Research
- Training
- Experience





Continuum of Care Model

- Accident to Recovery
- Field, Ambulance, ER, OR, PICU, Floor
- Rehab, Home, School, Post School
- MUST COVER ALL of THESE

Prevention – Key!!!!

- MVA
 - Seat belts, airbags, Drunk driving
- Helmets
- Parental education





- <http://www.cdc.gov/traumaticbraininjury/pubs/>



Dr J's Laws for Parents

- Two Feet on The Ground Rule
- No helmet
 - no bike or scooter
- No seatbelt
 - not leaving or stay home



Questions

