

TBI:

Launching a New Era of Classification

Geoffrey Manley, MD PhD

on behalf of the NASEM TBI Forum and the

NIH-NINDS TBI Classification and Nomenclature Initiative



National Institute of
Neurological Disorders
and Stroke





A new characterisation of acute traumatic brain injury: the NIH-NINDS TBI Classification and Nomenclature Initiative

Geoffrey T Manley, Kristen Dams-O'Connor*, Michael L Alosco, Hibah O Awwad, Jeffery J Bazarian, Peter Bragge, John D Corrigan, Adele Doperalski, Adam R Ferguson, Christine L Mac Donald, David K Menon, Molly M McNett, Joukje van der Naalt, Lindsay D Nelson, Dana Pisciă, Noah D Silverberg, Nsini Umoh, Lindsay Wilson, Esther L Yuh, Henrik Zetterberg, Andrew I R Maas†, Michael A McCreath, on behalf of the members of the NIH-NINDS TBI Classification and Nomenclature Initiative‡*

Marking a New Age in Characterization of Acute Traumatic Brain Injury: The National Institute of Neurological Disorders and Stroke Traumatic Brain Injury Classification and Nomenclature Initiative

Authors: [Geoffrey T. Manley](#) , [Kristen Dams-O'Connor](#), [Hibah O. Awwad](#), [Adele Doperalski](#), [Nsini Umoh](#), [Andrew I. R. Maas](#), and [Michael A. McCreath](#) | [AUTHORS INFO & AFFILIATIONS](#)

Journal of
Neurotrauma

The Many Faces of Traumatic Brain Injury



At least
4.8 million seek
medical care in the
US each year....

And Increasing!

NASEM: TBI a Roadmap for Accelerating Progress



1

Create and implement an **updated classification system** for TBI.

2

Integrate **acute** and **long-term** person- and family-centered **management** of TBI.

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Traumatic Brain Injury: 2025

Classification

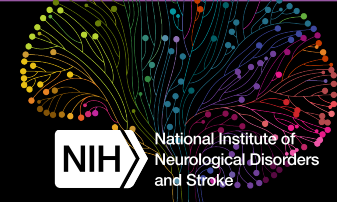
Mild
Severe
Moderate



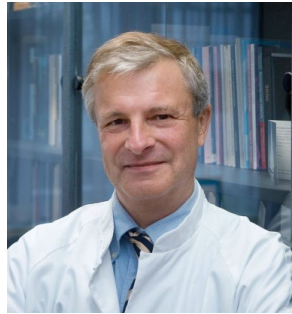
What is wrong with Mild, Moderate, and Severe TBI?

- No modern TREATABLE disease uses such an imprecise classification
- “Mild TBI” is not always mild.....”Severe TBI” is not always severe
- Limited association with mechanism – failed clinical trials
- No effective targeted treatments for mild, moderate, severe
- These terms lead to treatment bias
 - nihilism in Severe, disregard for Mild
- **Patients and families do not want us to use these terms**

WORKSHOP STEERING COMMITTEE



Kristen Dams O'Connor



Andrew Maas



Geoffrey Manley



Michael McCrea



Nsini Umoh

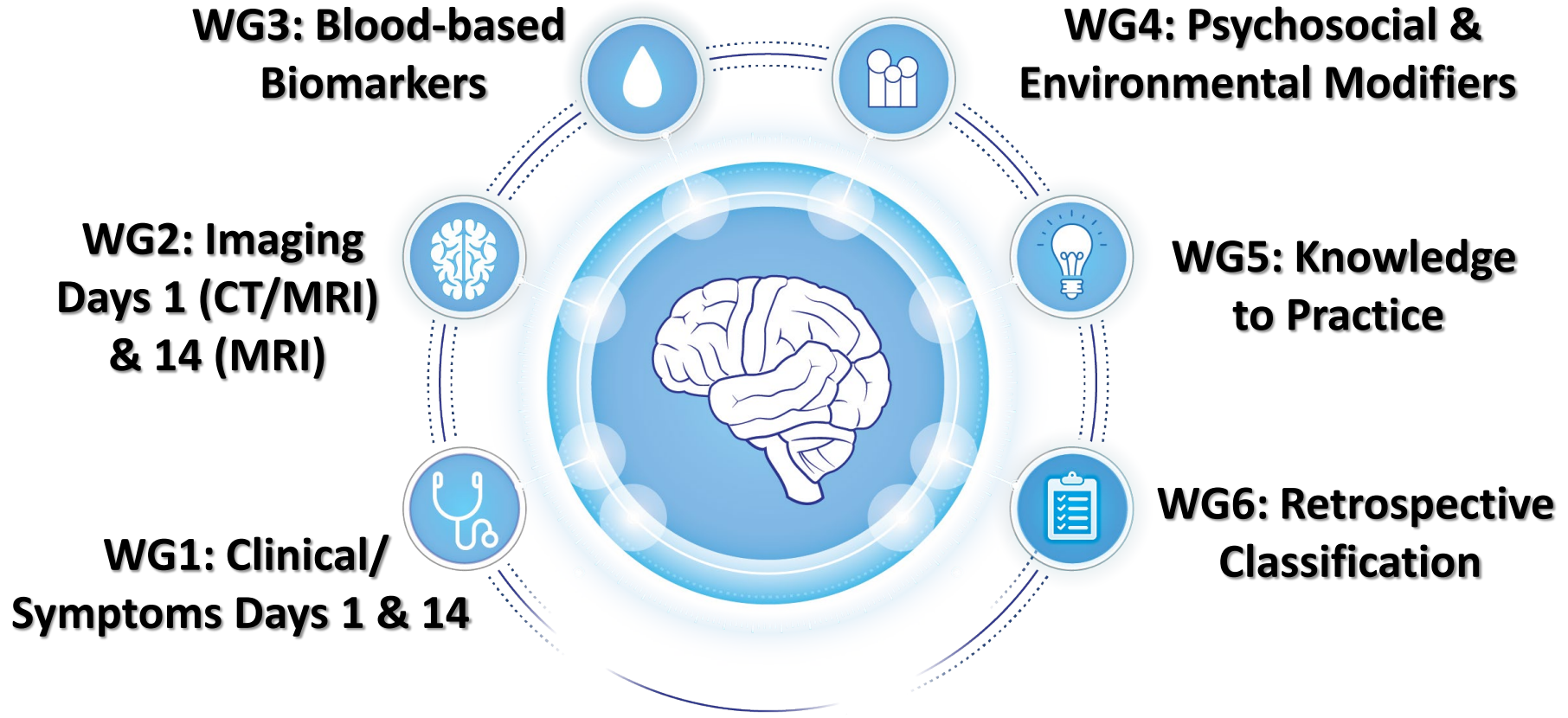
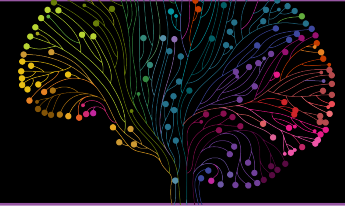


Hibah Awwad

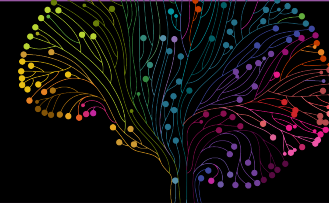


**Adele
Doperalski**

WORKING GROUPS



Working Groups



WORKING GROUP CHAIRS

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Noah Silverberg
Adam Ferguson
Christine MacDonald
Esther Yuh
Jeff Bazarian
Henrik Zetterberg
Lindsay Nelson
Lindsay Wilson
John Corrigan
Mike Alosco
Joukje van der Naalt
Peter Bragg

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Experience**
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Lindsay Simpson
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Melanie Wienhoven
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Infinity Conference Group &
Rose Li and Associates
Heather Cameron
Nancy Tuveson
Maya Sapiurka
Charlene Thomas
NINDS Support
Alicia Diggs
Claudio Villalobos Dintrans
NINDS Leadership
Walter Koroshetz
Lyn Jakeman
Patrick Bellgowan

NINDS Traumatic Brain Injury (TBI) Classification and Nomenclature Workshop

January 22-23, 2024 | NIH Campus | Bethesda, MD



- Gap – Severity Index; Insufficient Nomenclature
 - Mild, Moderate, Severe

3 Feb 2022

Military.com | By Patricia Kime

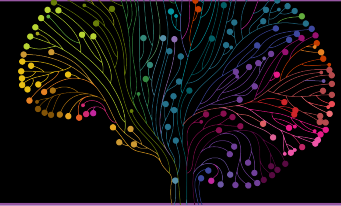
The terms "mild," "moderate" and "severe," used by doctors to categorize head injuries in roughly 2 million Americans each year, are outdated and imprecise, and treatments based on those terms are leading to increased medical costs and preventable deaths, a group of medical experts wrote in a report published Feb. 1.

At least 439,000 U.S. service members have been diagnosed with brain injuries since 2000, with more than 83% of those classified as "mild" and roughly 36,000 defined as "moderate" or "severe."

These common labels for defining a [traumatic brain injury](#) may obscure the severity of head injuries, however, leading to inadequate treatment and potential harm to the patient, according to a [report published this week](#) by the National Academies of Sciences, Engineering and Medicine.



CBI-M FRAMEWORK



PILLARS CRITICAL TO CHARACTERIZATION &
CLASSIFICATION OF INJURY

C CLINICAL

B BIOMARKERS

I IMAGING



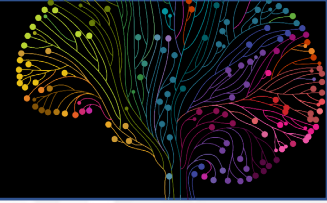
FACTOR INFLUENCING ASSESSMENT,
MANAGEMENT, RECOVERY & OUTCOME

M MODIFIERS

- INJURY FACTORS
- PATIENT FACTORS
- SOCIAL & ENVIRONMENTAL FACTORS

For Clinical & Research Applications

CBI-M: Case Examples



28 yo s/p fall +LOC

“Mild” TBI or Not So Mild?

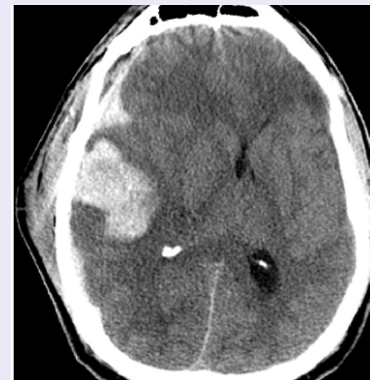
GCS 14, GFAP 400, SAH



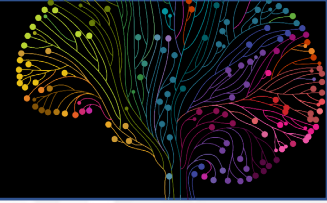
28 yo s/p fall +LOC

“Mild” TBI or Not So Mild?

GCS 14, GFAP 3,200,
SAH/Contusion



CBI-M: Case Examples



28 yo s/p fall +LOC
“Mild” TBI or Not So Mild?
GCS 14, GFAP 400, SAH



CBI-M

Graduate Education
Employed
Supportive Family

10th Grade Education
Unemployed
Alcohol Use Disorder
Homeless

CBI-M: A NEW ERA IN TBI



**Moving Beyond the
Limitations of
“Mild, Moderate, Severe”**

C

CLINICAL

B

BIOMARKERS

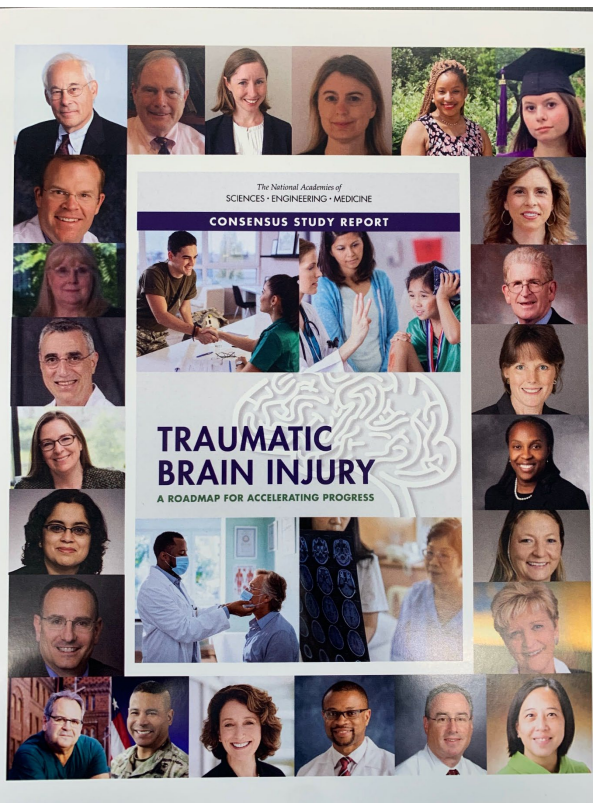
I

IMAGING

M

MODIFIERS

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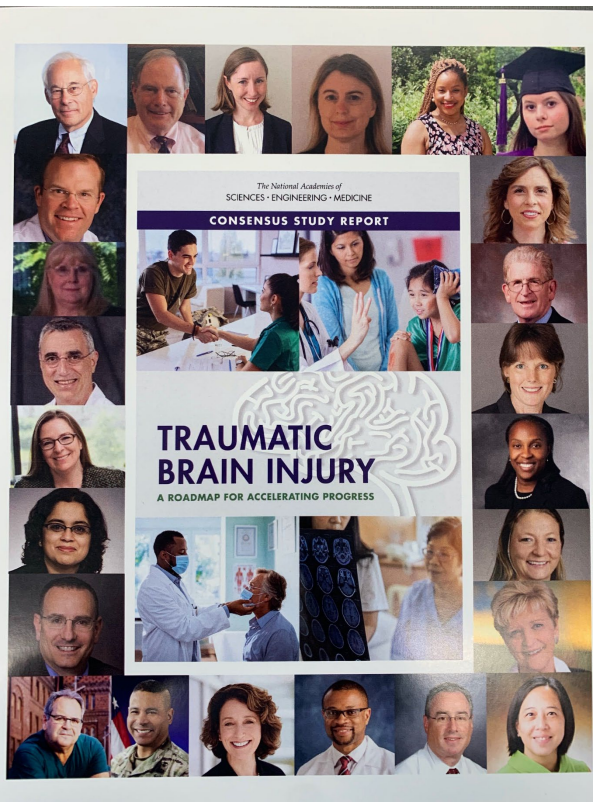
ACS TRAUMA QUALITY PROGRAMS

**BEST
PRACTICES
GUIDELINES**

**THE MANAGEMENT
OF TRAUMATIC
BRAIN INJURY**

**ACS Trauma
Programs**
American College of Surgeons

NASEM: TBI a Roadmap for Accelerating Progress



1

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3

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Enh
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by heal



Medical
Countermeasures.gov



Abbott



TRACK-TBI NET
Transforming Research and Clinical Knowledge
in Traumatic Brain Injury Network

TBI Aid in Diagnosis

NASEM: TBI a Roadmap for Accelerating Progress



Barbara and Gerson
Bakar Foundation



Weill Family
Foundation

TBI Learning Healthcare System



Systematically gather and
create evidence.

Apply the most promising evidence
to improve care.

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local and regional **integrated**
care delivery systems for TBI.

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TBI system of **care** with TBI **research**
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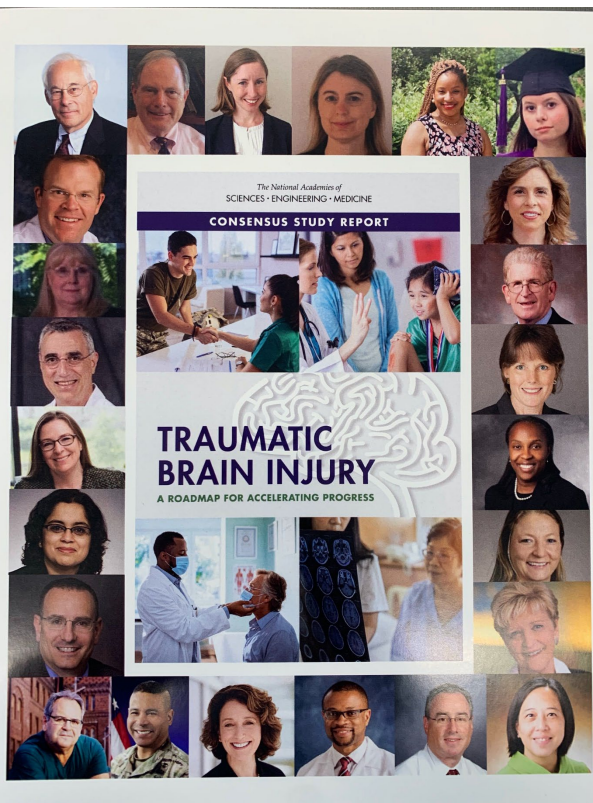
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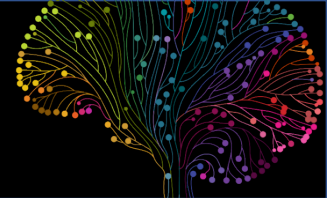
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A New Approach to TBI Drug Trials

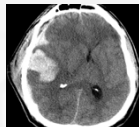


TBI Enrichment

Eligible Participants:

TBI (ACRM Criteria)
Age 18-65, CT scan

Cohort



C

GCS 9-15

B

GFAP 100 – 15K pg/ml

I

+ CT (excluding EDH)

Placebo

Drug 1

Drug 2

Drug 3

Potential Drug 4

Interim

Interim

Final
Analyses

1° Outcome
GOSE-TBI

2° Outcomes

GFAP

NfL

BTACT

RPQ

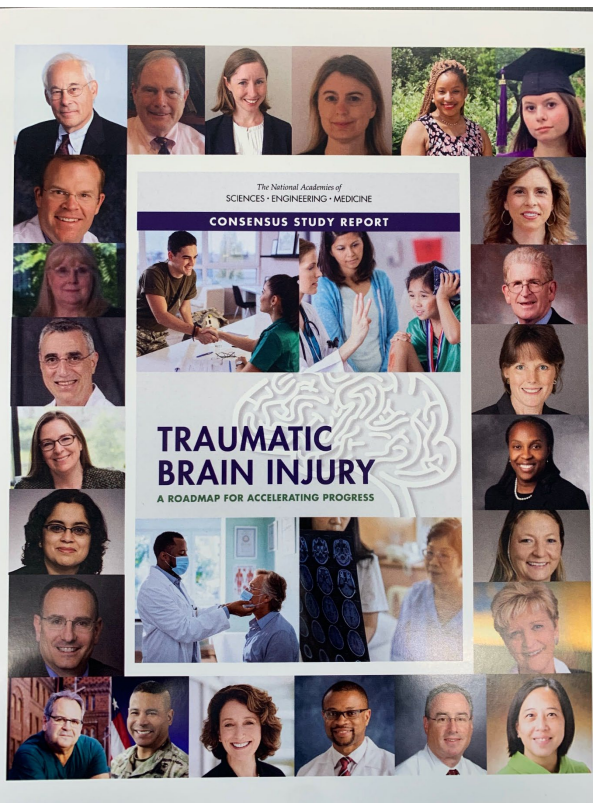
MRI-DTI

Stage I Stage II Stage III

DRUGS 1, 2, 3, 4, 5, 6.....



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Forum on Traumatic Brain Injury

<https://www.nas.edu/TBIForum>



A Broad TBI Coalition



University of California
San Francisco
advancing health worldwide

**RUSK
REHABILITATION
AT NYU LANGONE**

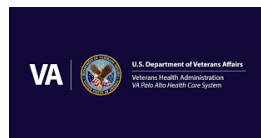
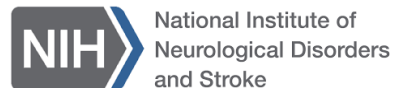


BrainScope®



**UC DAVIS
HEALTH**

**UC San Diego
HEALTH SYSTEM**



TOYOTA



**AVALON
ACTION ALLIANCE**

TBI Forum Faces



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