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Traumatic brain injury in pregnant mothers and implications for fetal development

Jonathan Lifshitz, PhD

@Ganglion11

Neurotrauma & Social Impact research team
Health Science Specialist, Phoenix VA Health Care System
Research Professor of Psychiatry, University of Arizona College of Medicine – Phoenix

To empower clinical providers to make informed decisions with their patients regarding diagnosis, prognosis, and treatment of traumatic brain injury (TBI)

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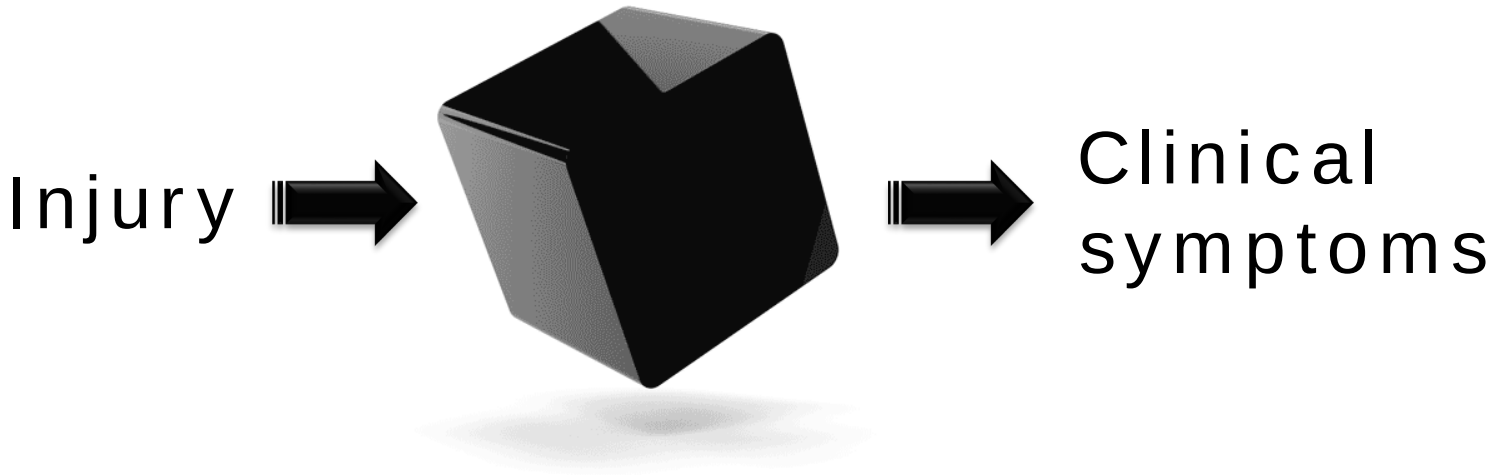
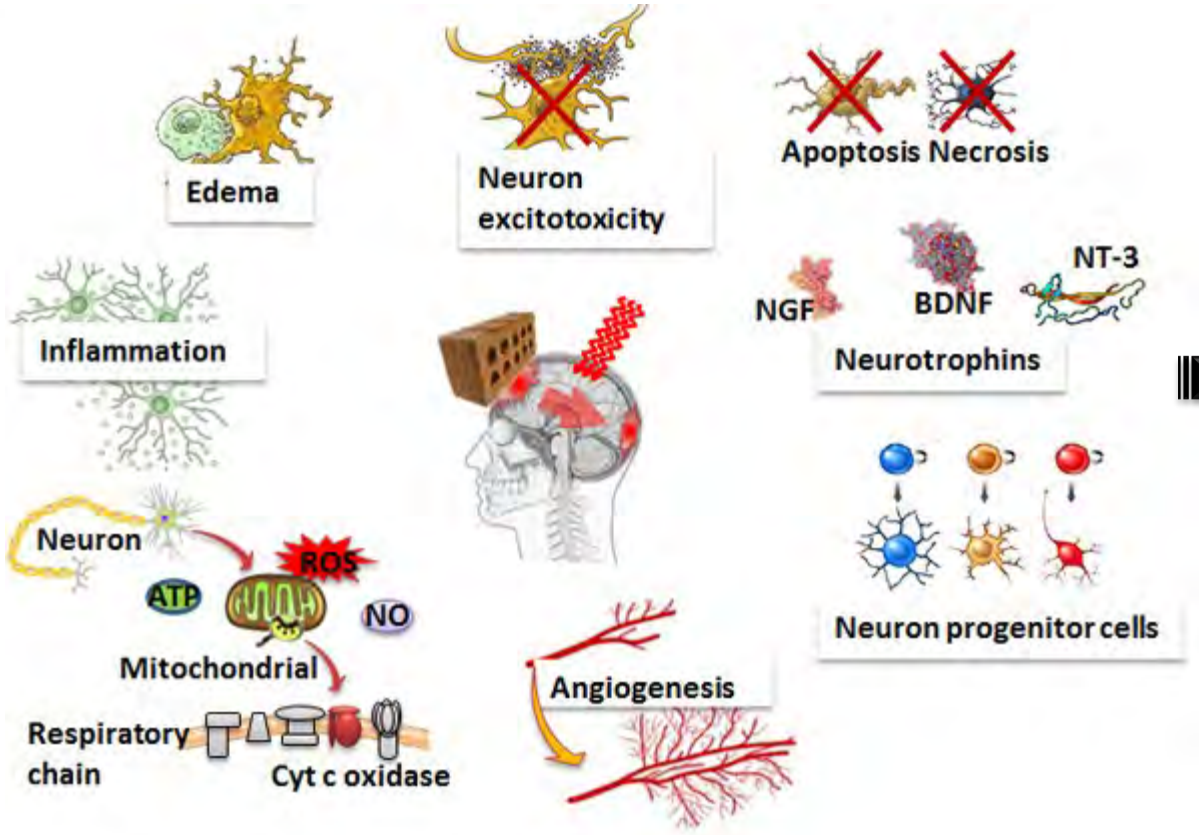
Brain Injury: complex pathophysiological processes affecting the brain, induced by biomechanical forces, resulting in clinical symptoms



wellman.massgeneral.org/faculty-hamblin.htm

Brain Injury: complex pathophysiological processes affecting the brain, induced by biomechanical forces, resulting in clinical symptoms

Injury



Clinical symptoms

wellman.massgeneral.org/faculty-hamblin.htm

Brain Injury: complex pathophysiological processes affecting the brain, induced by biomechanical forces, resulting in clinical symptoms

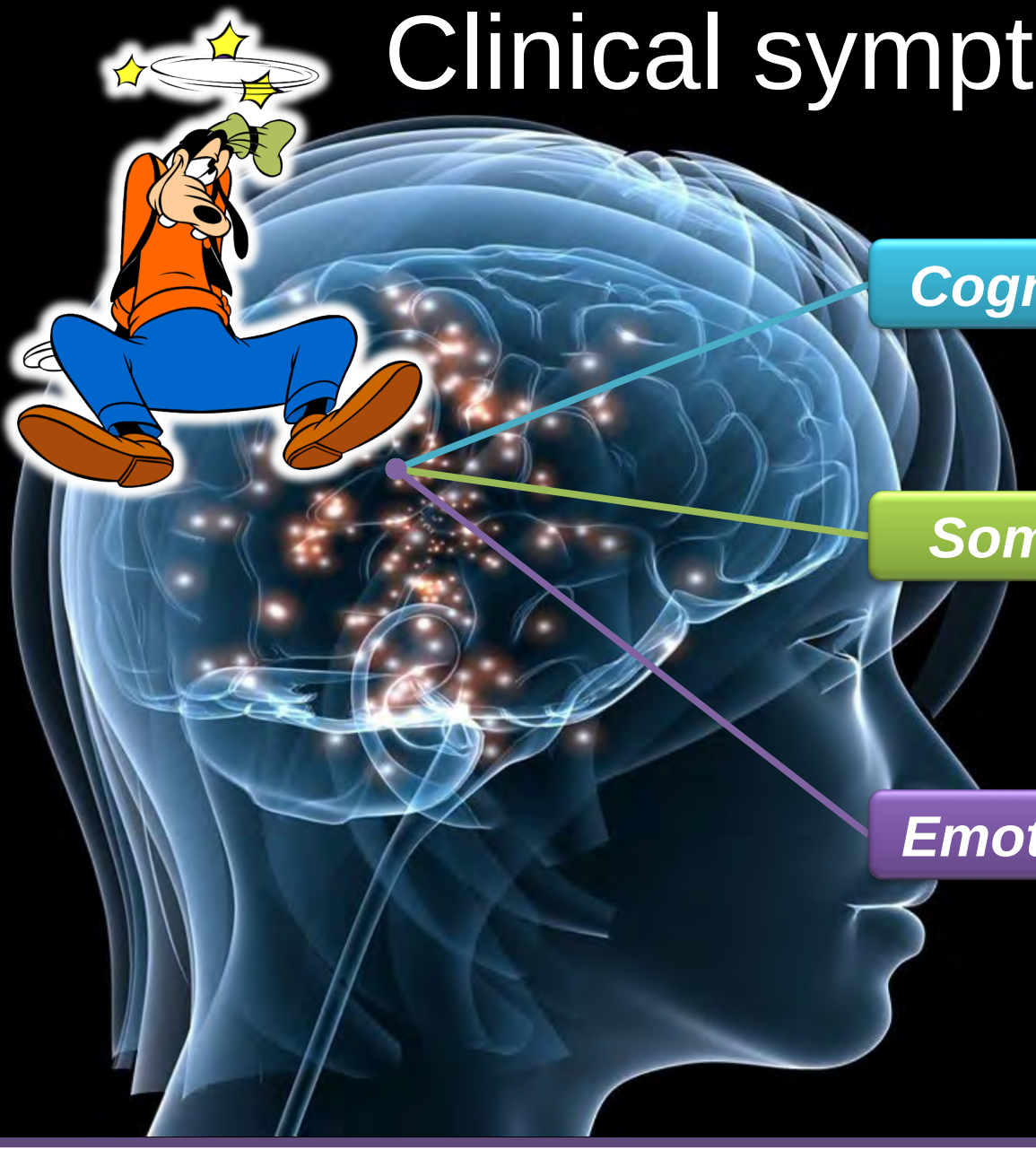
Injury ➡

➡ Clinical symptoms

Primary injury ripens into secondary injury

wellman.massgeneral.org/faculty-hamblin.htm

Clinical symptoms of brain injury



Cognitive

- Poor concentration
- Memory problems / loss
- Feel “slowed down”
- Slurred speech
- Difficulty reading
- Confusion

Somatic

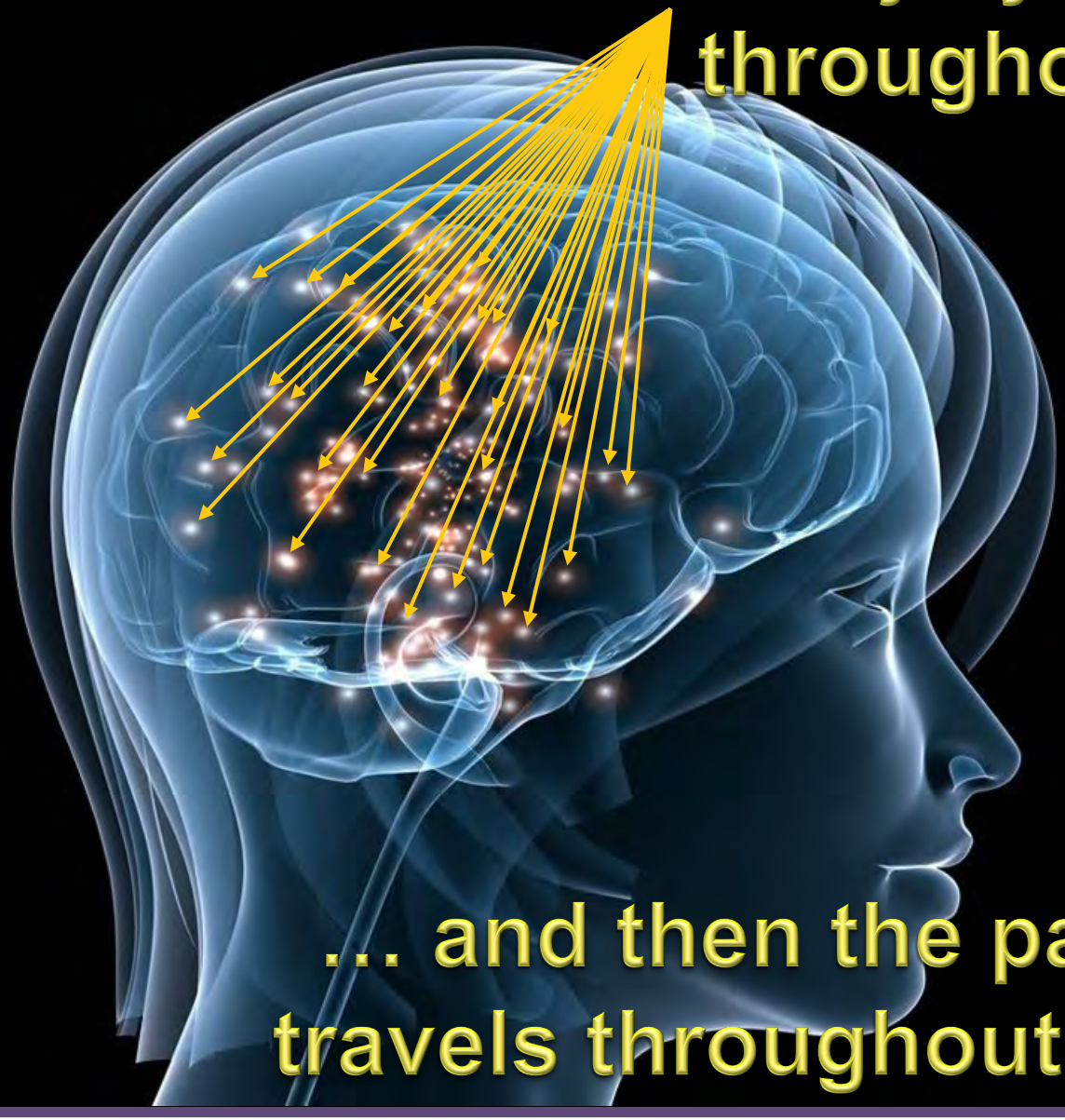
- Sensitivity to light or sound
- Dizziness; Poor balance
- Numbness; Tingling
- Drowsiness; Sleep problems
- Blurred vision
- Seizure
- Chronic pain
- Headache

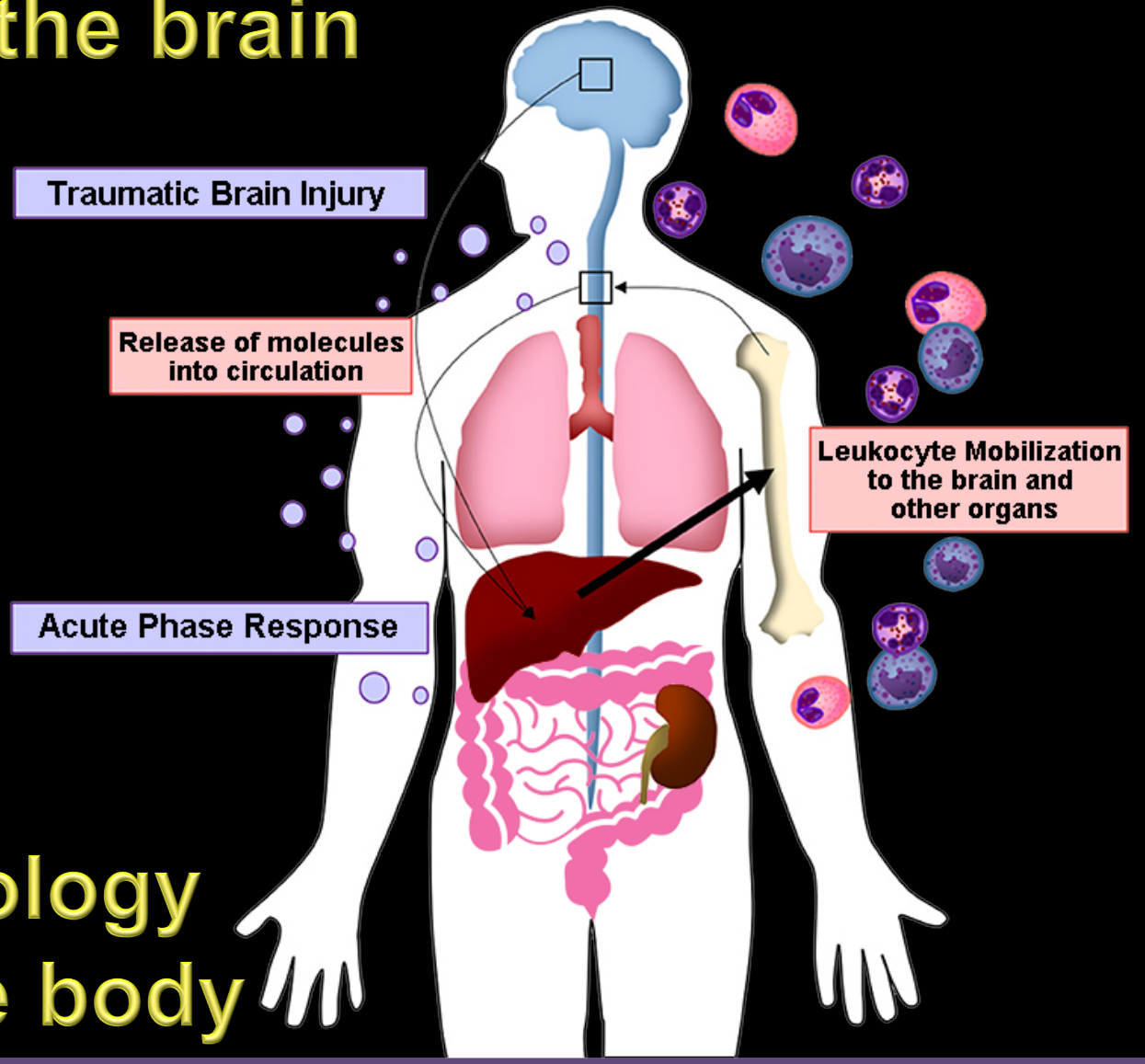
Emotional

- Drowsiness; Sleep problems
- Depression; Sadness
- Lack of motivation
- Appetite changes
- Irritability
- Nervousness
- Impulsiveness
- Aggression

How much brain has to be injured?

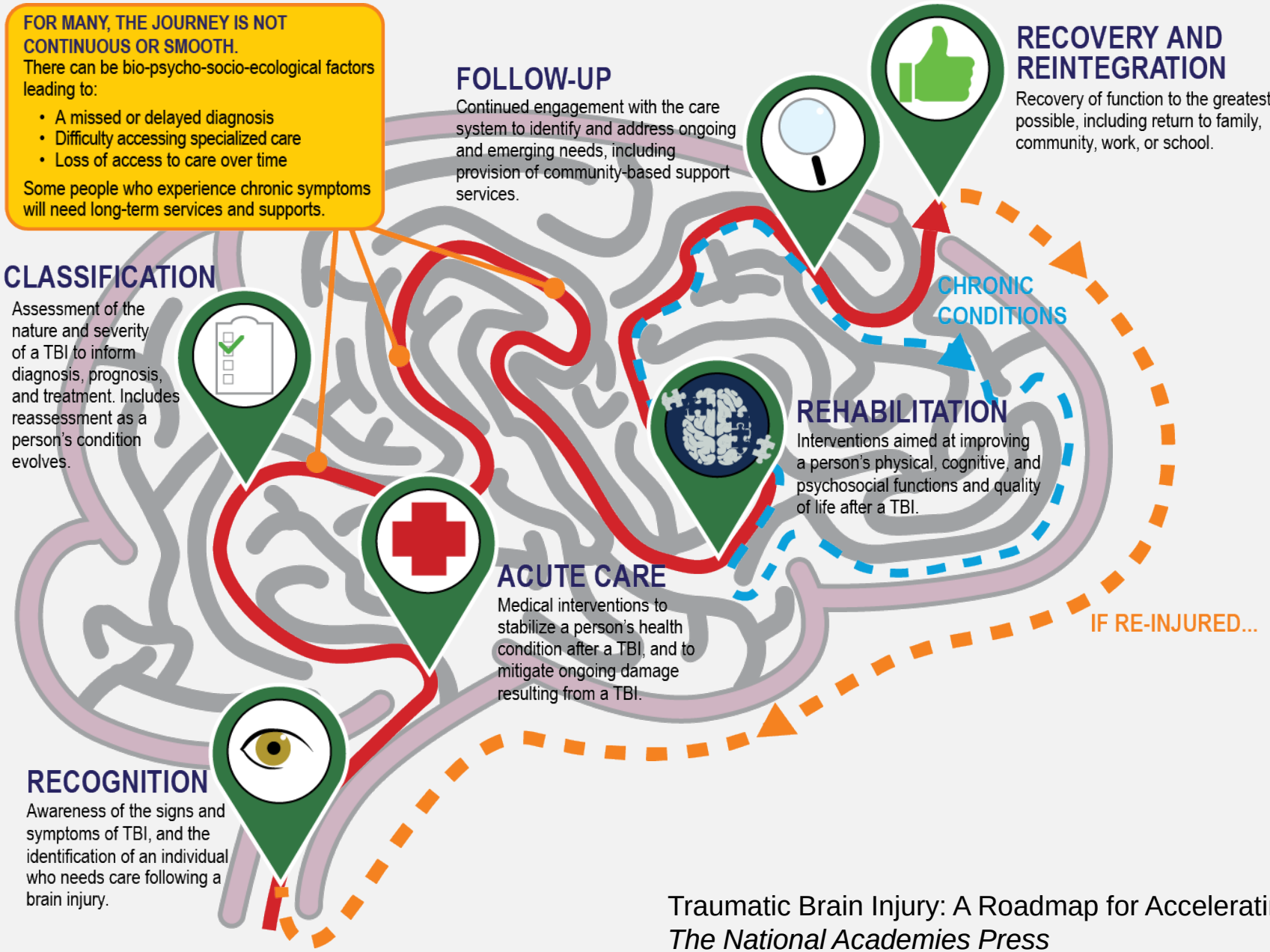
Injury scattered throughout the brain





… and then the pathology travels throughout the body

STAGES OF A CARE JOURNEY AFTER TBI



Traumatic Brain Injury: A Roadmap for Accelerating Progress (2022)
The National Academies Press

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The vast majority of research studies in the laboratory and clinic have been conducted in males.

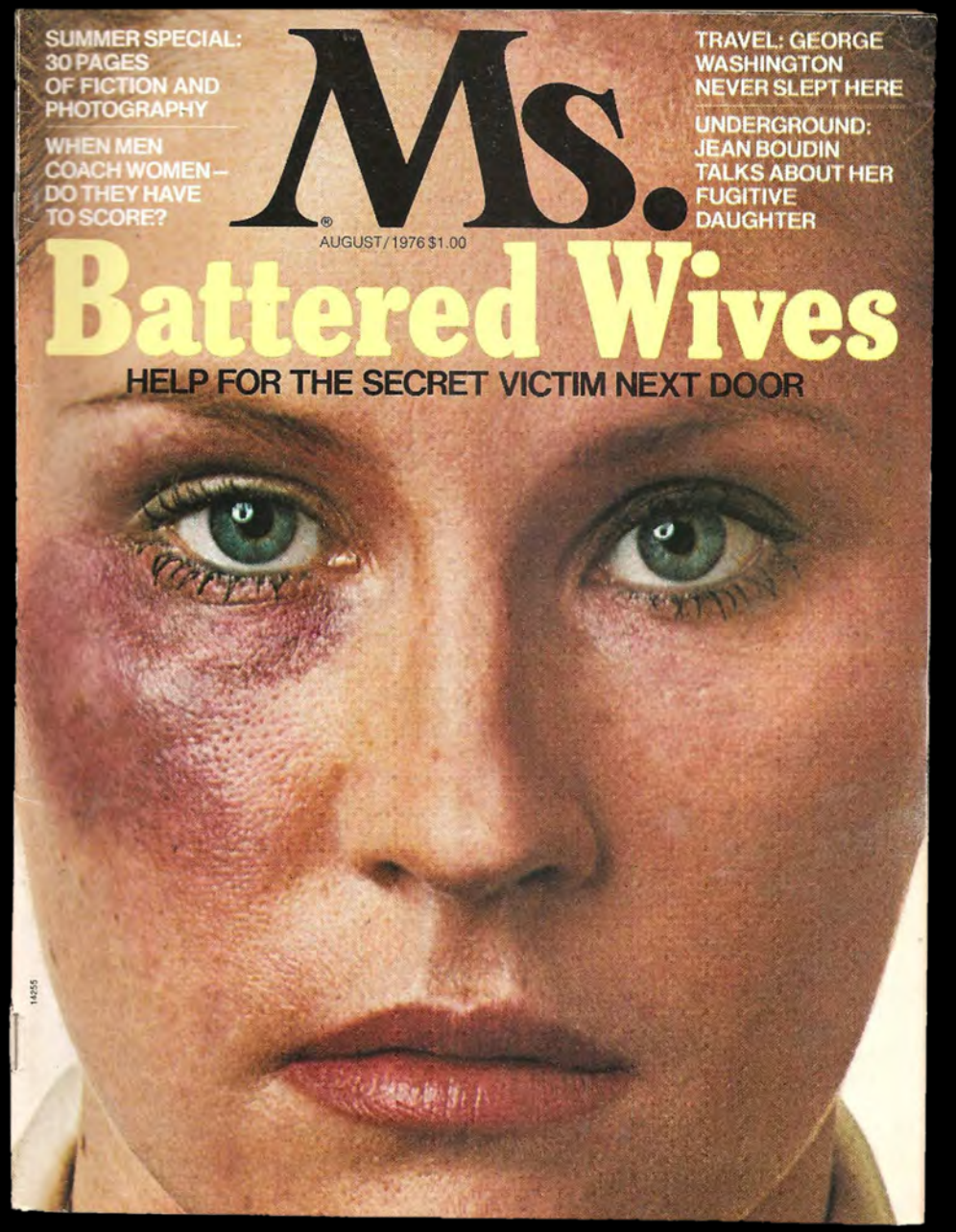
♂

2010


RANGERS ACE CLIFF LEE: WHY HE'LL BE THE DIFFERENCE
By TOM VERDUCCI
AUBURN QB CAM NEWTON: RACING TOWARD THE HEISMAN
By LARS ANDERSON
Sports Illustrated
CONCUSSIONS
SPECIAL REPORT
THE HITS THAT ARE CHANGING THE GAME...
By PETER KING
...AND THE HITS NO ONE IS NOTICING
By DAVID EPSTEIN

♂

♀


SUMMER SPECIAL: 30 PAGES OF FICTION AND PHOTOGRAPHY
WHEN MEN COACH WOMEN – DO THEY HAVE TO SCORE?
Ms.
AUGUST/1976 $1.00
TRAVEL: GEORGE WASHINGTON NEVER SLEPT HERE
UNDERGROUND: JEAN BOUDIN TALKS ABOUT HER FUGITIVE DAUGHTER
Battered Wives
HELP FOR THE SECRET VICTIM NEXT DOOR

1975

Contemporary Themes

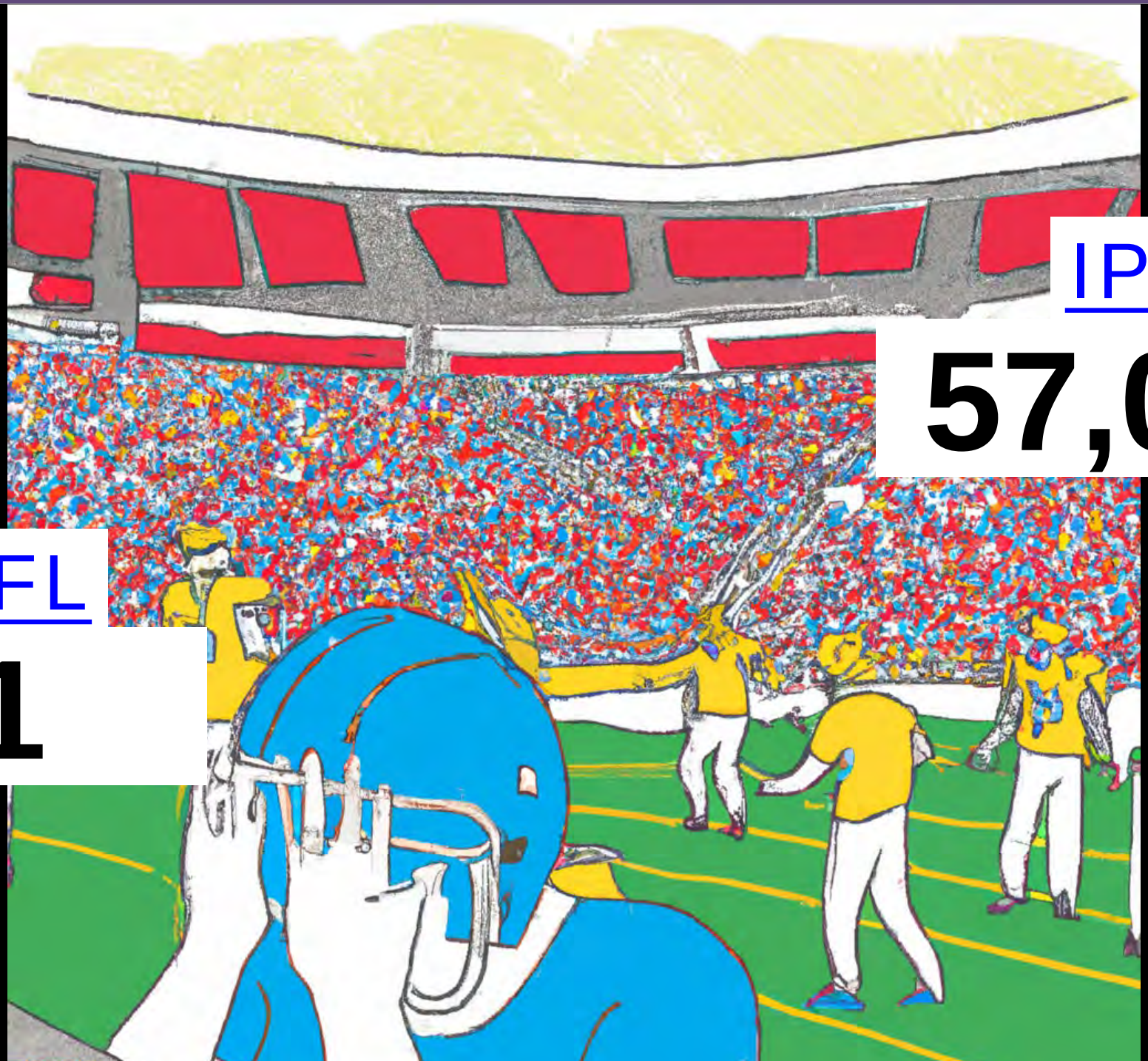
Wife Battering: a Preliminary Survey of 100 Cases

J. J. GAYFORD

British Medical Journal, 1975, 1, 194-197 BRITISH MEDICAL JOURNAL 25 JANUARY 1975

"He hit me with his fists, feet, and bottles, smashing me to the floor; then he started to kick, sometimes with repeated blows to the face and other parts of the body. He has kicked me in the ribs and broken them, he has tried to strangle me and taken me by the shoulders and banged my head against the floor.

During my marriage of nearly four years I have received constant bruises all over my body, this has been more so during pregnancy. I have received black eyes, cut lips, and swollen nose. Most of my bruises, have been to the scalp where they do not show."



NFL

1

IPV

57,000

NFL

1

IPV

57,000

60-92% of survivors receive facial or head injuries during violence episodes, but the actual numbers are underreported

St Ivany & Schminkey, 2016; Corrigan et al, 2001; Ruff et al., 2009

DEMOGRAPHICS

Articles

Domestic Violence
Risk Factors and Outcomes

DANIEL C. BERRIOS, MD, MPH, *and* DEBORAH GRADY, MD, MPH, *San Francisco, California*

Domestic violence is a pervasive and frequently unrecognized cause of injury among women. We reviewed data from standardized interviews with 218 women who presented to an emergency department with injuries due to domestic violence. Victims ranged in age from 16 to 66 years and constituted a wide range of socioeconomic and ethnic backgrounds. Domestic violence often resulted in severe injury; 28% of the women interviewed required admission to hospital for injuries, and 13% required major surgical treatment. The typical presentation was injuries to the face, skull, eyes, extremities, and upper torso. A third of the cases involved a weapon, such as a knife, club, or gun. In all, 10% of the victims were pregnant at the time of abuse, and 10% reported that their children had also been abused by the batterer. Most victims (86%) had suffered at least one previous incident of abuse, and about 40% had previously required medical care for abuse. Victim recognition and referral to appropriate agencies could be improved if primary care physicians were more aware of the prevalence, severity, frequency of occurrence, and typical presentation of domestic violence.

(Berrios DC, Grady D: Domestic violence—Risk factors and outcomes. West J Med 1991 Aug; 155:133-135)

TABLE 3.—*Abuse History*

Interview Question	*No.*	*(%)**	*% Not Recorded*
Previous incidents of abuse	187	(86)	3
Requiring medical attention	87	(40)	10
Requiring hospital admission	29	(13)	12
Ever abused while pregnant	66	(30)	11
Ever miscarried due to abuse	11	(5)	16

TABLE 4.—*Types of Injury*

Injury	*No.*	*(%)**	*% Not Recorded*
Bruises	152	(70)	13
Laceration	86	(39)	3
Musculoskeletal injury	54	(25)	4
Choking	49	(23)	4
Internal injuries	29	(13)	5
Loss of consciousness	23	(11)	22
Permanent injury	10	(5)	22
Burn or scald	3	(1)	4

TABLE 5.—*Location of Injury*

Location	*No.*	*(%)**
Face	149	(68)
Extremities	107	(49)
Skull	104	(48)
Eyes	97	(45)
Chest, ribs, upper back	97	(45)
Abdomen, pelvis, lower back	42	(19)
Sexual assault	25	(12)
Neck	12	(6)

*Percentages total > 100% because some women had injuries in more than 1 location.

CLINICAL SYMPTOMS

Perceptual and Motor Skills, 2001, 92, 682-686.

NEUROPSYCHOLOGICAL ASSESSMENT OF BATTERED WOMEN: A PILOT STUDY[1]

CHRISTINE DEERING, DONALD I TEMPLER, JACQUELINE KELLER, AND MERLE CANFIELD

California School of Professional Psychology–Fresno

Subjects

Records indicated that all 52 women who resided at the Young Women's Christian Association (YWCA) Marjoree Mason Center, a safe shelter for domestic violence victims, had a history of battering that included trauma to the head within the past year. All 52 women volunteered, but 33 were excluded because of substance abuse. The 10 controls had never been in a physically abusive relationship. In an interview with the principal investiga-

TABLE 1

MEANS, STANDARD DEVIATIONS, AND RANGES FOR ASSAULT VARIABLES

Variable	*M*	*SD*	Range
Duration of relationships, yr.	5.9	4.34	15–.5
Number of concussions	2.8	4.14	15–0
Number of assaults with blows to head	219.7	264.91	960–1
Number without blows to the head	725.4	1195.17	4928–2
Total number of assaults	945.1	1352.68	5656–14

TABLE 2

SCORE MEANS AND STANDARD DEVIATIONS FOR 19 BATTERED WOMEN AND 10 CONTROL WOMEN

Test	Battered Women		Controls		*F*
	M	*SD*	*M*	*SD*	
Quick Neurological Screening Test					
Five Subtests Combined	16.4	8.2	3.7	1.1	23.37†
Finger to Nose	1.1	1.1	.2	.2	5.24
Thumb-Finger Circle	4.1	1.9	.9	.6	25.91†
Rapid Hand Movement	1.4	1.7	.5	.5	2.34
Tandem Walk	7.2	3.7	1.2	.6	26.11†
One-leg Stand	2.4	1.1	2.0	3.2	.21
Halstead-Reitan					
Impairment Index	.61	.23	.21	.20	20.65
Category	60.5	23 8	14.7	4.5	35.78†
TPT-Total Time	18′ 14″‡	10′ 00″‡	11′ 32″‡	20′ 2″‡	3.71
TPT-Localization	3.4	2 7	4.2	2.2	.67
TPT-Memory	6.4	1.3	7.3	1.6	2.55
Finger Tapping	41.8	6.3	53.4	5.8	23.39†
Rhythm	5.3	3.8	4.1	3.3	.72
SSPT	9.9	5.8	6.2	4.8	2.95
Finger-tip Writing	2.2	1.0	1.1	.8	8.71†
Aphasia	5.1	4.7	2.4	4.3	2.23
Wechsler Memory Scale–R					
General Memory	86.4	17.8	103.0	9.6	7.50
Verbal Memory	84.3	16.3	98.1	10.4	5.88
Visual Memory	99.1	17.3	113.7	8.6	6.24
Attention/Concentration	81.3	17.8	97.4	14.0	6.11
Delayed Recall	87.4	24.1	111.0	14.6	8.30*

*$p < .01$. †$p < .001$. ‡Minutes and seconds.

Journal of Neurotrauma
Volume 41, Number 3-4, 2024

https://doi.org/10.1089/neu.2023.0358

Mary Ann Liebert, Inc. publishers

Original Article

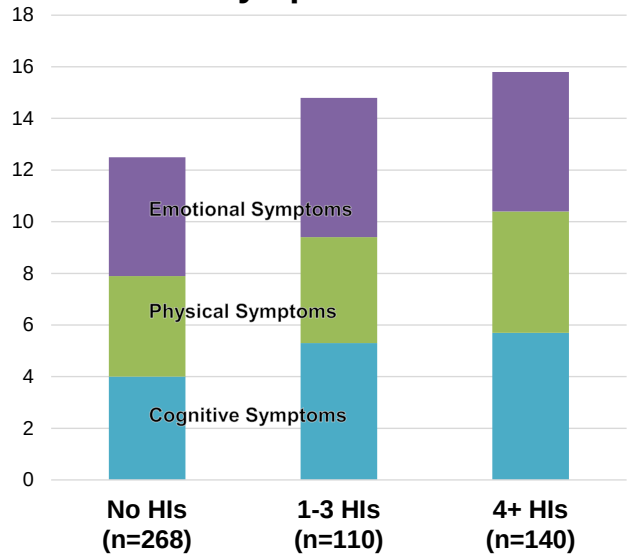
Repetitive Head Injury and Cognitive, Physical, and Emotional Symptoms in Women Survivors of Intimate Partner Violence

Justin E. Karr[1,*], Sharon E. Leong[1], Eric O. Ingram[1], and T.K. Logan[2]

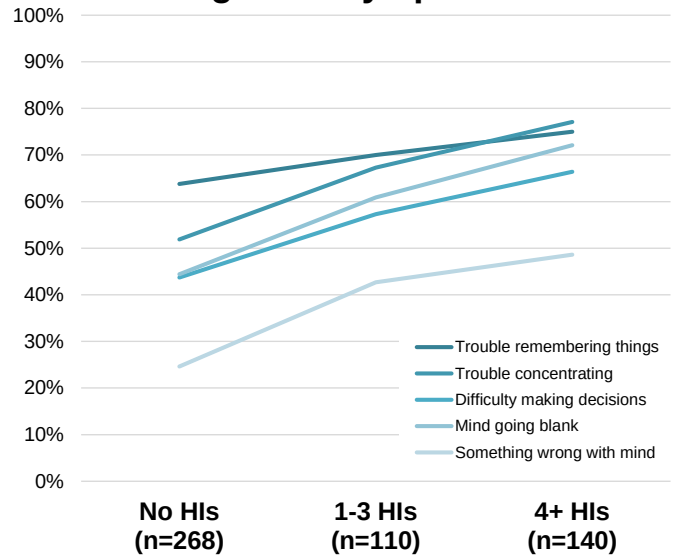
Participants

Participants included 641 cisgender women from Kentucky who were recruited from courts in urban and rural jurisdictions after receiving a protective order against an intimate partner. Women were eligible if they were: 1) age 18 or older or 17 and emancipated; 2) experienced IPV from a male perpetrator with whom they were married, cohabitated, or shared a child; 3) had a protective order issued; and 4) did not plan on moving out of Kentucky in the next 12 months. Prior research has involved secondary analysis of this sample.[18,48]

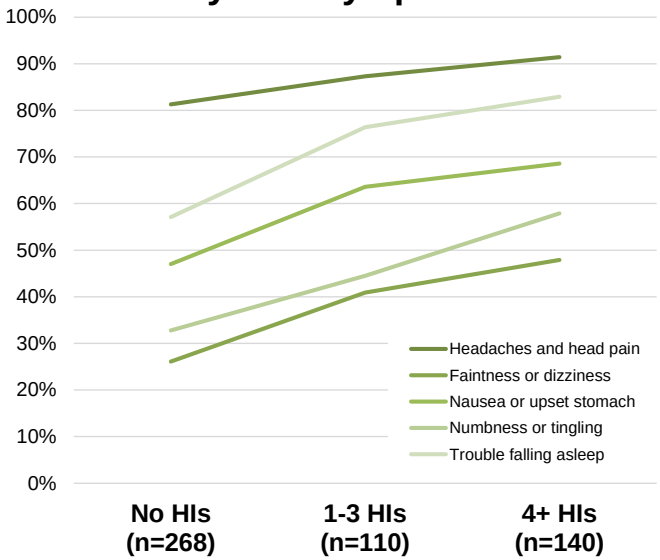
Symptoms



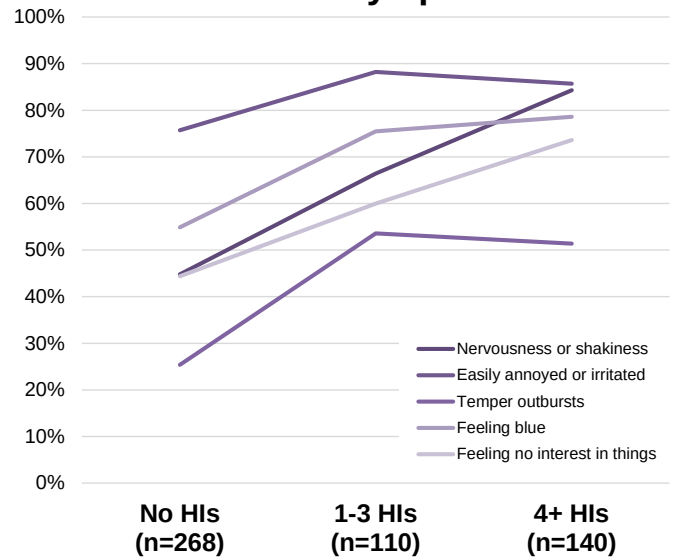
Cognitive Symptoms



Physical Symptoms



Emotional Symptoms



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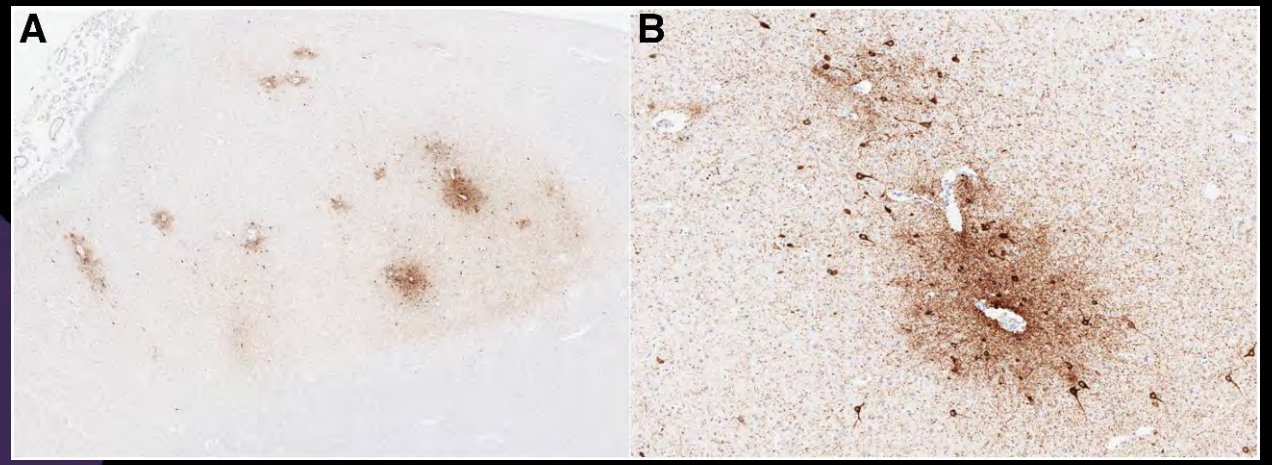
PATHOLOGY

Dementia in a punch-drunk wife

Relatives told us that her husband had been violent towards her for many years, particularly in relation to his drinking, and the patient had often been seen with cuts and bruises…

Chronic Traumatic Encephalopathy (CTE)-Type Neuropathology in a Young Victim of Domestic Abuse

A 29-year-old woman with a history of being the victim of domestic violence. Autopsy revealed evidence of significant remote head injuries in the form of extensive scars over the scalp and so-called "cauliflower ears".



Neuropathological findings.

Upper septum fenestrated, with cavum (arrow) Lower large numbers of β-amyloid protein-containing diffuse (non-congophilic, non-neuritic) plaques in frontal cortex Typical senile plaques conspicuous by their absence (×300)

Roberts et al. (1990) *Lancet*
Danielsen et al. (2021) *JNEN*

Acta Neuropathologica
https://doi.org/10.1007/s00401-023-02646-1

ORIGINAL PAPER

The neuropathology of intimate partner violence

Kristen Dams-O'Connor[1,2] · Alan C. Seifert[3] · John F. Crary[4,5,6] · Bradley N. Delman[3] · Marc R. Del Bigio[7,8] · Gabor G. Kovacs[9,10] · Edward B. Lee[11] · Amber L. Nolan[12] · Ariel Pruyser[1] · Enna Selmanovic[1] · William Stewart[13,14] · Emma Woodoff-Leith[4,5,6] · Rebecca D. Folkerth[15,16]

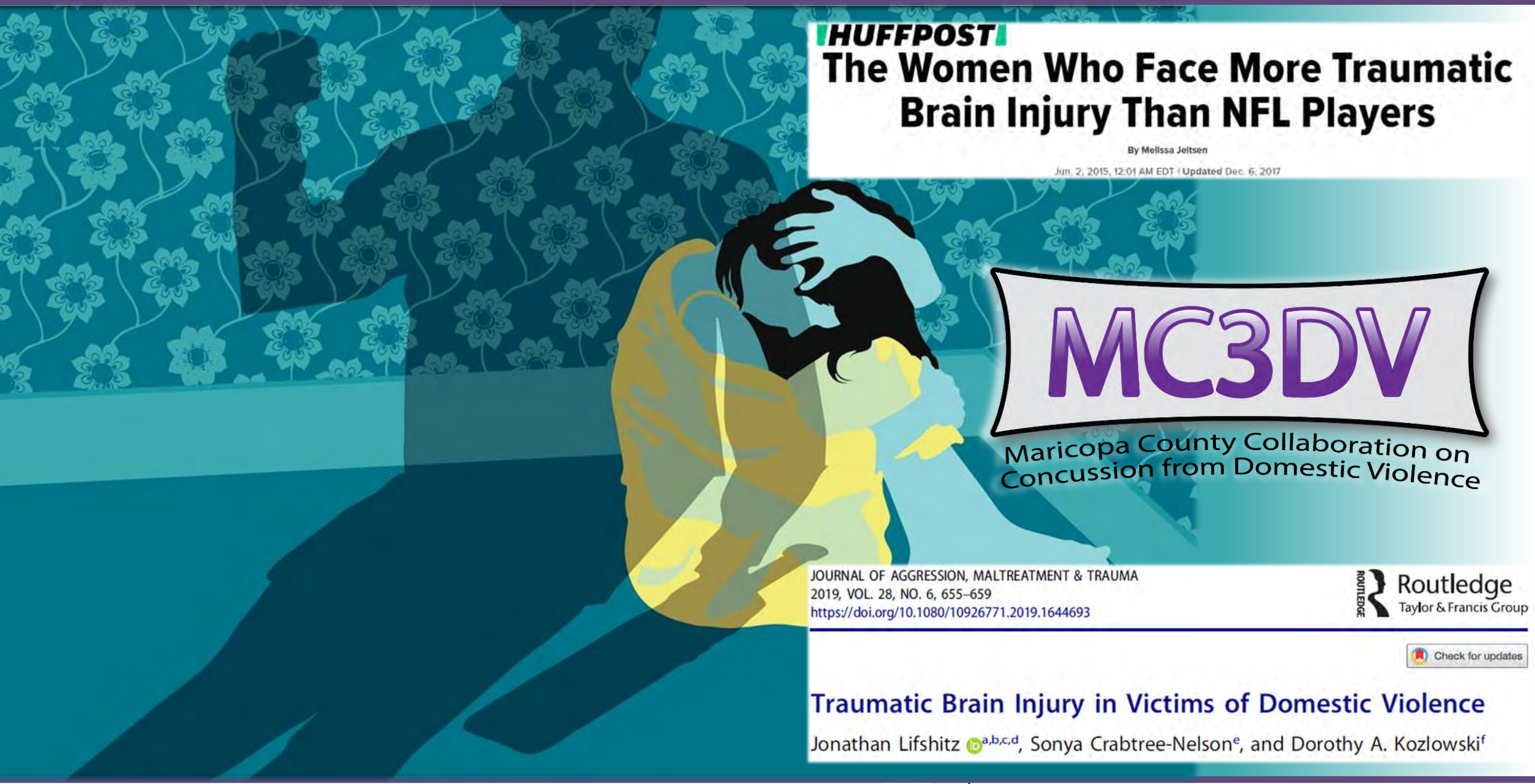
Received: 8 May 2023 / Revised: 14 October 2023 / Accepted: 14 October 2023

Abstract

Lifelong brain health consequences of traumatic brain injury (TBI) include the risk of neurodegenerative disease. Up to one-third of women experience intimate partner violence (IPV) in their lifetime, often with TBI, yet remarkably little is known about the range of autopsy neuropathologies encountered in IPV. We report a prospectively accrued case series from a single institution, the New York City Office of Chief Medical Examiner, evaluated in partnership with the Brain Injury Research Center of Mount Sinai, using a multimodal protocol comprising clinical history review, ex vivo imaging in a small subset, and comprehensive neuropathological assessment by established consensus protocols. Fourteen brains were obtained over 2 years from women with documented IPV (aged 3rd–8th decade; median, 4th) and complex histories including prior TBI in 6, nonfatal strangulation in 4, cerebrovascular, neurological, and/or psychiatric conditions in 13, and epilepsy in 7. At autopsy, all had TBI stigmata (old and/or recent). In addition, white matter regions vulnerable to diffuse axonal injury showed perivascular and parenchymal iron deposition and microgliosis in some subjects. Six cases had evidence of cerebrovascular disease (lacunes and/or chronic infarcts). Regarding neurodegenerative disease pathologies, Alzheimer disease neuropathologic change was present in a single case (8th decade), with no chronic traumatic encephalopathy neuropathologic change (CTE-NC) identified in any. Findings from this initial series then prompted similar exploration in an expanded case series of 70 archival IPV cases (aged 2nd–9th decade; median, 4th) accrued from multiple international institutions. In this secondary case series, we again found evidence of vascular and white matter pathologies. However, only limited neurodegenerative proteinopathies were encountered in the oldest subjects, none meeting consensus criteria for CTE-NC. These observations from this descriptive exploratory study reinforce a need to consider broad co-morbid and neuropathological substrates contributing to brain health outcomes in the context of IPV, some of which may be potentially modifiable.

Intimate partner violence intensifies TBI as a healthcare epidemic

TBI intensifies intimate partner violence as a healthcare epidemic



HUFFPOST

The Women Who Face More Traumatic Brain Injury Than NFL Players

By Melissa Jeltsen

Jun. 2, 2015, 12:01 AM EDT | Updated Dec. 6, 2017

MC3DV

Maricopa County Collaboration on Concussion from Domestic Violence

JOURNAL OF AGGRESSION, MALTREATMENT & TRAUMA
2019, VOL. 28, NO. 6, 655–659
https://doi.org/10.1080/10926771.2019.1644693

Routledge
Taylor & Francis Group

Check for updates

Traumatic Brain Injury in Victims of Domestic Violence

Jonathan Lifshitz [a,b,c,d], Sonya Crabtree-Nelson[e], and Dorothy A. Kozlowski[f]

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Original Research Article

Violence Against Women
2022, Vol. 28(10) 2259–2285

DOI: 10.1177/10778012211025993
journals.sagepub.com/home/vaw
SAGE

Nonfatal Strangulation During Domestic Violence Events in New South Wales: Prevalence and Characteristics Using Text Mining Study of Police Narratives

Mandy Wilson[1], Erin Spike[2], George Karystianis[2], and Tony Butler[2]

-- Event XXXXXXXXX : -- Created : XXXXXXXXXXXXXXXXXXXX -- Narrative 1 of 3 –

The victim named XXX and the defendant, XXX have been living together in XXX, XXX with the victims two children, age XXX and XXX. They have been involved romantically for three years. Due to his frequent drug abuse, the defendant has psychotic episodes in which he physically abuses the victim.

In XXX, around morning, the defendant asked the victim to make breakfast. After the victim went to the kitchen to start preparing breakfast, the defendant snapped and flipped over the dining table screaming " I told you to make breakfast!". The victims daughter started crying and the defendant yelled "make that brat quiet, or I will!". The victim asked the defendant if he has taken his medication to which he replied that he did. Just when the victim was going upstairs to put laundry, the defendant stood in front of her and slapped her with his left hand across her face. He then began to kick the victim before placing his hands around the victims throat and starting choking her.

The victim screamed " what the hell is wrong with you?". The defendant then started crying and saying that he was sorry and he did not mean anything. At this point, the victim called her mother and left the house with her two children going immediately at the police station in XXX. The police observed a large bruise on the right side of the victims face and red marks around her throat.

INJURIES: Victim has a bruise on her face and red marks in the throat area.

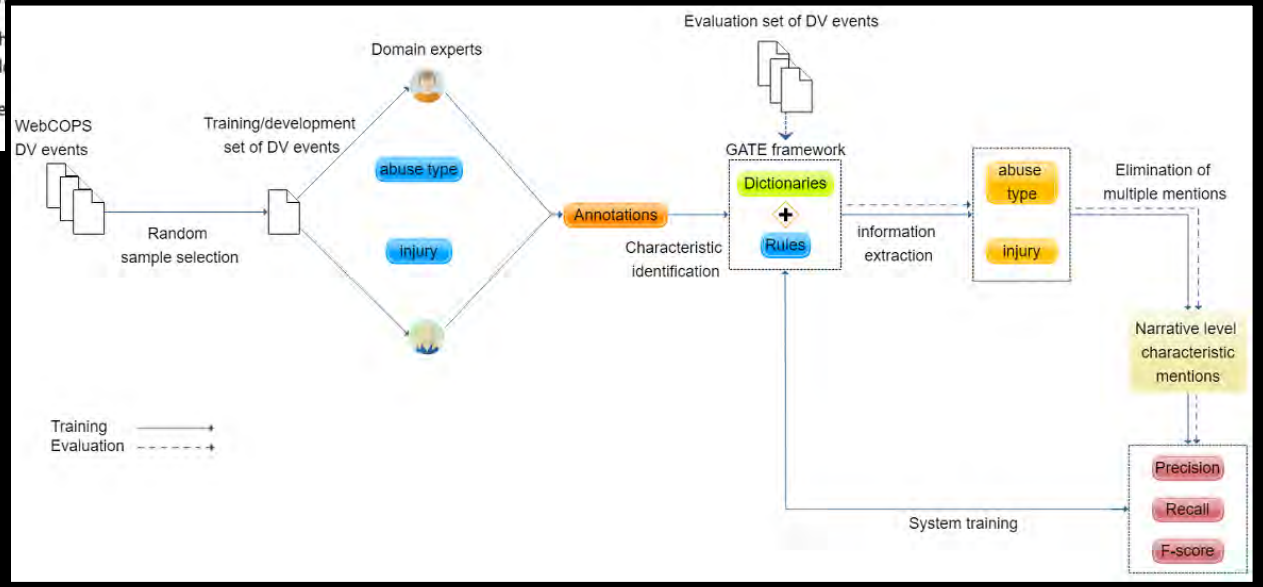
EVIDENCE AND EFFECTS OF ALCOHOL & DRUGS: Nil

MENTAL HEALTH & OTHER ISSUES: The defendant suffers from paranoid schizophrenia and is an alcoholic.

FIREARMS / DANGEROUS WEAPONS: kitchen knife

FEARS HELD BY THE VICTIM: Victim fears that th
abuse her and is afraid that he will hurt her chil

ACTIONS TAKEN BY THE POLICE: Victim stateme
charged.



2005-2016

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Original Research Article

Nonfatal Strangulation During Domestic Violence Events in New South Wales: Prevalence and Characteristics Using Text Mining Study of Police Narratives

Violence Against Women
2022, Vol. 28(10) 2259–2285

DOI: 10.1177/10778012211025993
journals.sagepub.com/home/vaw
SAGE

Mandy Wilson[1], Erin Spike[2], George Karystianis[2], and Tony Butler[2]

	Perpetrators		
	DV perpetrators involved in at least one event in which NFS occurred ($n = 6,711$)	DV perpetrators not involved in an event in which NFS occurred ($n = 117,063$)	All DV perpetrators ($n = 123,774$)
Age (years) at first DV event, median (IQR)	32.2 (25.6–39.9)	34.5 (27.0–42.6)	34.4 (27.0–42.5)
Age group (years) at first DV event, *n* (%)			
18–24 years	1,520 (22.7)	21,768 (18.6)	23,288 (18.8)
25–34 years	2,527 (37.7)	38,599 (33.0)	41,126 (33.2)
35–44 years	1,760 (26.2)	34,188 (29.2)	35,948 (29.0)
45–54 years	649 (9.7)	15,712 (13.4)	16,361 (13.2)
55–64 years	186 (2.8)	4,844 (4.1)	5,030 (4.1)
65+ years	69 (1.0)	1,952 (1.7)	2,021 (1.6)
Missing	N/A	N/A	N/A
Male, *n* (%)	6,321 (94.2)	96,556 (82.5)	102,877 (83.1)
Missing	1	27	28
Aboriginal, *n* (%)	1,690 (25.2)	24,521 (21.0)	26,211 (21.2)
Missing	N/A	N/A	N/A
Country of origin, *n* (%)			
Australia	1,983 (74.9)	33,962 (71.4)	35,945 (71.5)
Overseas	666 (25.1)	13,632 (28.6)	14,298 (28.5)
Missing	4,062	69,469	73,531

	Victims		
	DV victims involved in at least one event in which NFS occurred ($n = 6,728$)	DV victims not involved in an event in which NFS occurred ($n = 120,625$)	All DV victims ($n = 127,353$)
Age (years) at first DV event, median (IQR)	29.9 (23.1–37.8)	32.8 (25.2–41.0)	32.6 (25.1–40.9)
Age group (years) at first DV event, *n* (%)			
<18 years	268 (4.0)	3,161 (2.6)	3,429 (2.7)
18–24 years	1,925 (28.6)	26,029 (21.6)	27,954 (22.0)
25–34 years	2,313 (34.4)	39,891 (33.1)	42,204 (33.1)
35–44 years	1,505 (22.4)	32,153 (26.7)	33,658 (26.4)
45–54 years	537 (8.0)	14,013 (11.6)	14,550 (11.4)
55–64 years	133 (2.0)	3,895 (3.2)	4,028 (3.2)
65+ years	47 (0.7)	1,483 (1.2)	1,530 (1.2)
Missing	N/A	N/A	N/A
Male, *n* (%)	487 (7.2)	22,608 (18.8)	23,095 (18.1)
Missing	4	59	63
Aboriginal, *n* (%)	1,279 (19.0)	19,651 (16.3)	20,930 (16.4)
Missing	N/A	N/A	N/A
Country of origin, *n* (%)			
Australia	1,474 (83.2)	24,556 (81.1)	26,030 (81.3)
Overseas	297 (16.8)	5,706 (18.9)	6,003 (18.7)
Missing	4,957	90,363	95,320

Note. DV = domestic violation; NSW = New South Wales; NFS = nonfatal strangulation; IQR = interquartile range.
[a]Missing observations not included in the denominator for calculation of percentages. N/A: numbers of missing not applicable to this variable as the dataset did not differentiate between the absence of the characteristic versus the status of the characteristic being missing/unknown (i.e., if the characteristic was not flagged as being present, it was assumed to be absent).

	Perpetrator–victim pairs involved in at least one event in which NFS occurred ($n = 6,795$)	Perpetrator–victim pairs not involved in an event in which NFS occurred ($n = 131,761$)	All perpetrator–victim pairs involved in DV events ($n = 138,556$)
Pair sex (perpetrator–victim), n(%)			
Male–female	6,228 (91.7)	106,518 (80.9)	112,746 (81.4)
Female–female	73 (1.1)	1,812 (1.4)	1,885 (1.4)
Male–male	170 (2.5)	3,576 (2.7)	3,746 (2.7)
Female–male	319 (4.7)	19,769 (15.0)	20,088 (14.5)
Missing	5	86	91

Note. DV = domestic violation; NSW = New South Wales; NFS = nonfatal strangulation; IQR = interquartile range.
[a]Missing observations not included in the denominator for calculation of percentages.

2005-2016

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Single women's shelter data review

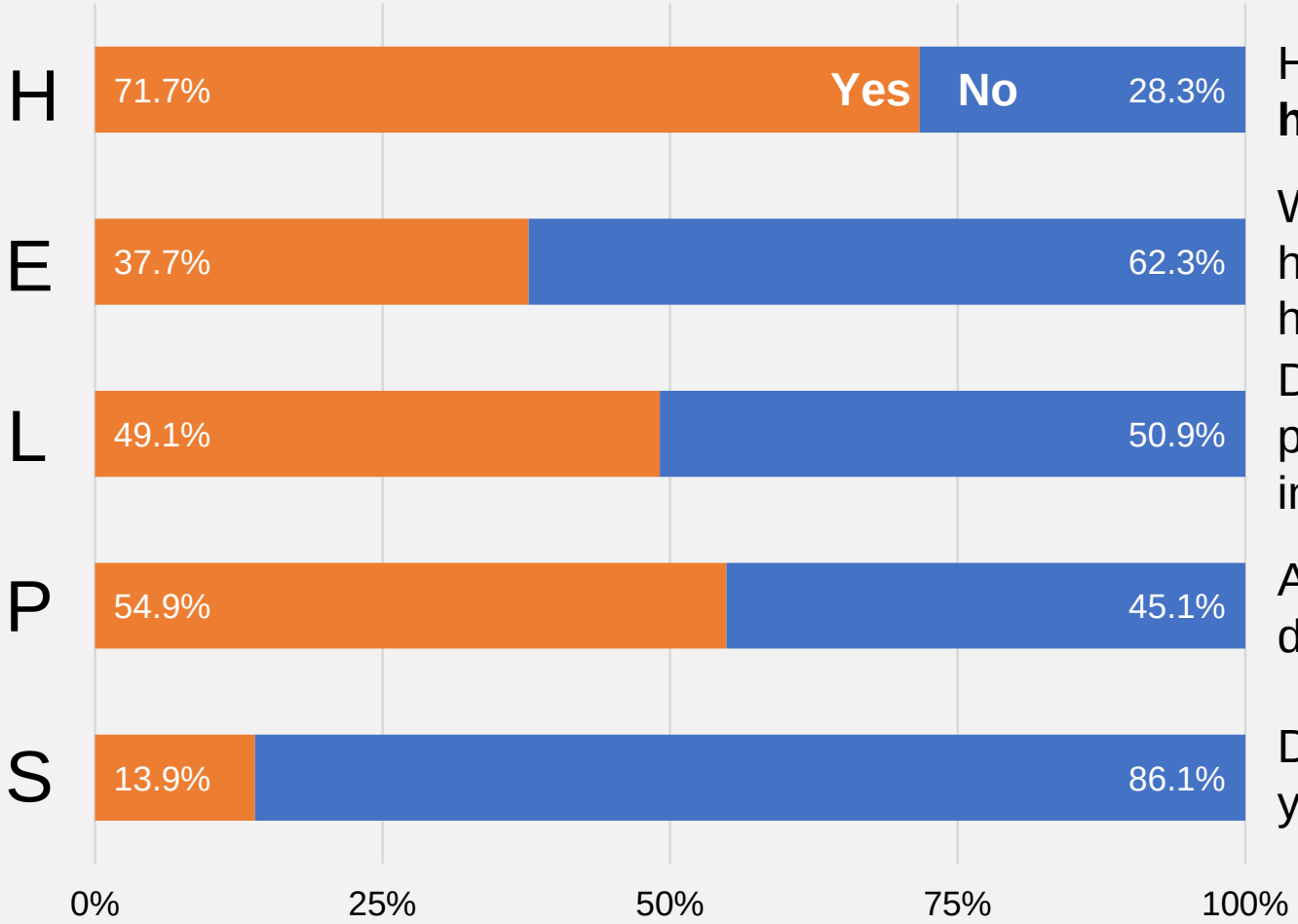
- Research Question:

  Do either the HELPS TBI screening tool or demographics predict DV shelter length of stay?

- Study Design:

  Data cleaning and then retrospective review of electronic records from September 2008 to December 2020, inclusive of >1,000 adult participants.

HELPS assessment from a domestic violence shelter in Maricopa County, AZ



Have you ever **hit** your **head** or been **hit** on the **head**?

Were you ever seen in the **emergency** room, hospital, or by a doctor because of an injury to your head?

Did you ever **lose** consciousness or experience a period of being dazed and confused because of an injury to your head?

Are you having cognitive or social **problems** in your daily life?

Did you experience a significant **sickness** following your head injury?

~2015-2020 n=1,719

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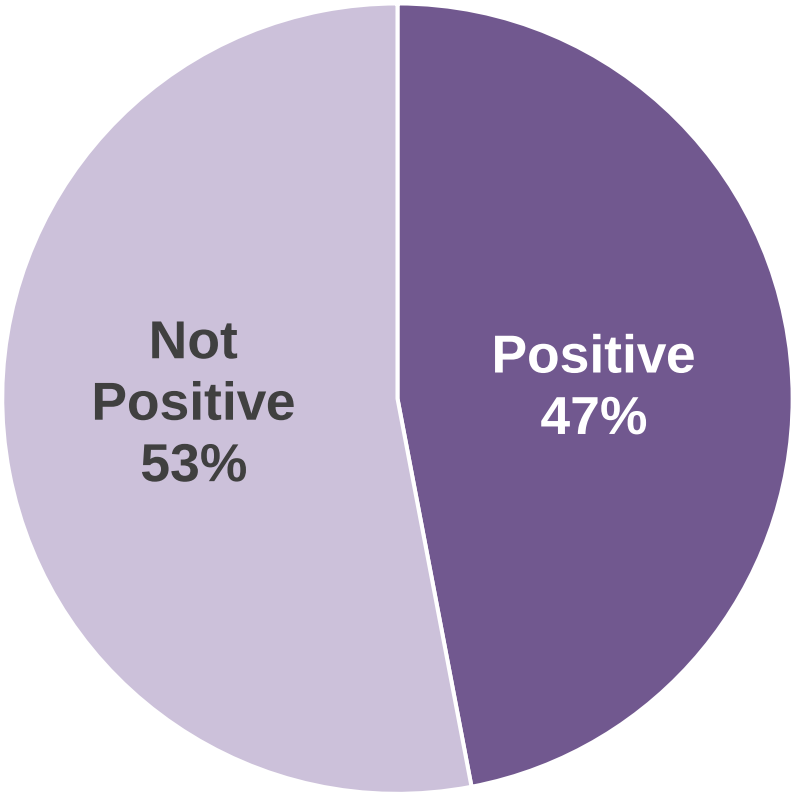
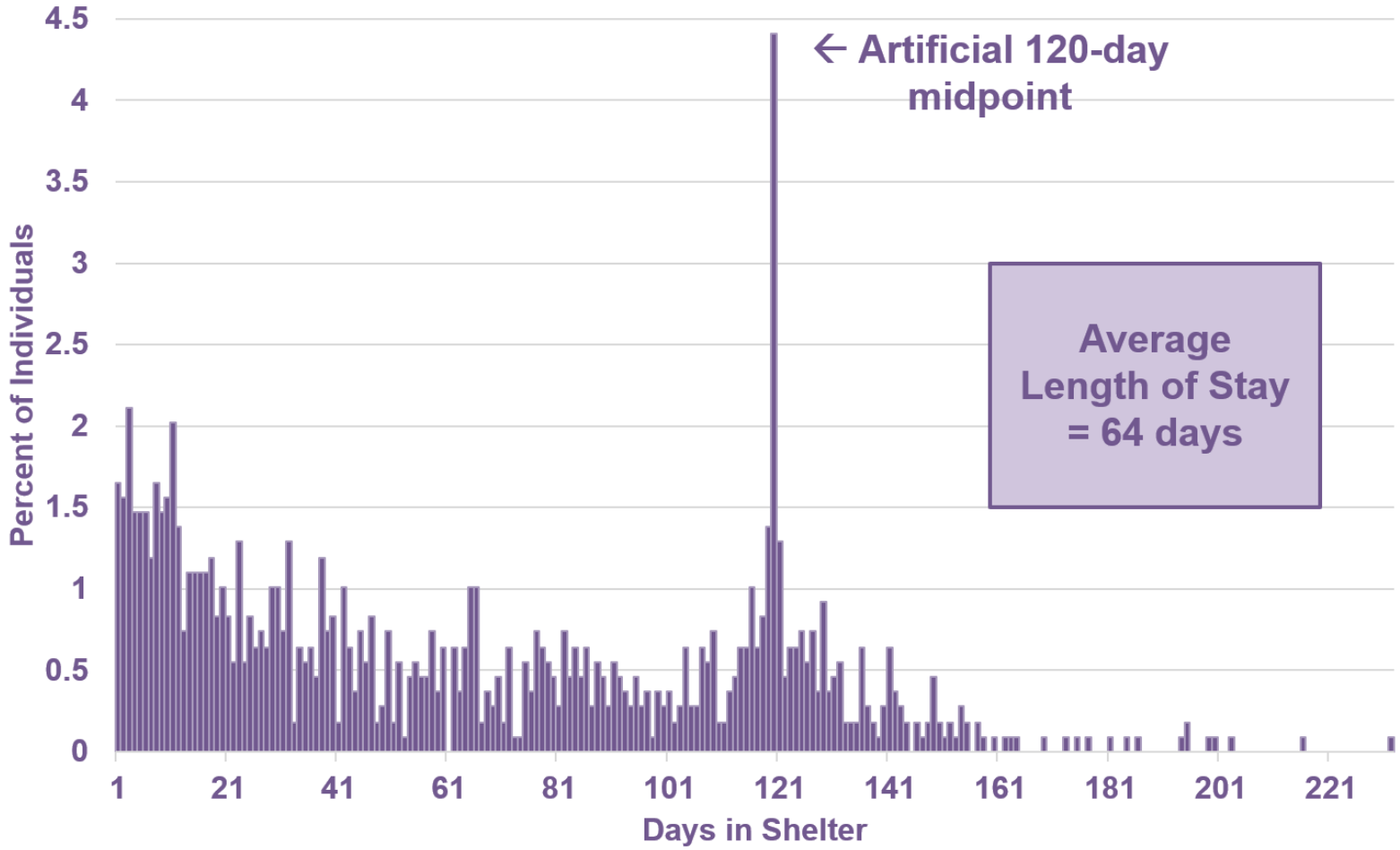
HELPS Screening



n = 1,088

Length of Stay



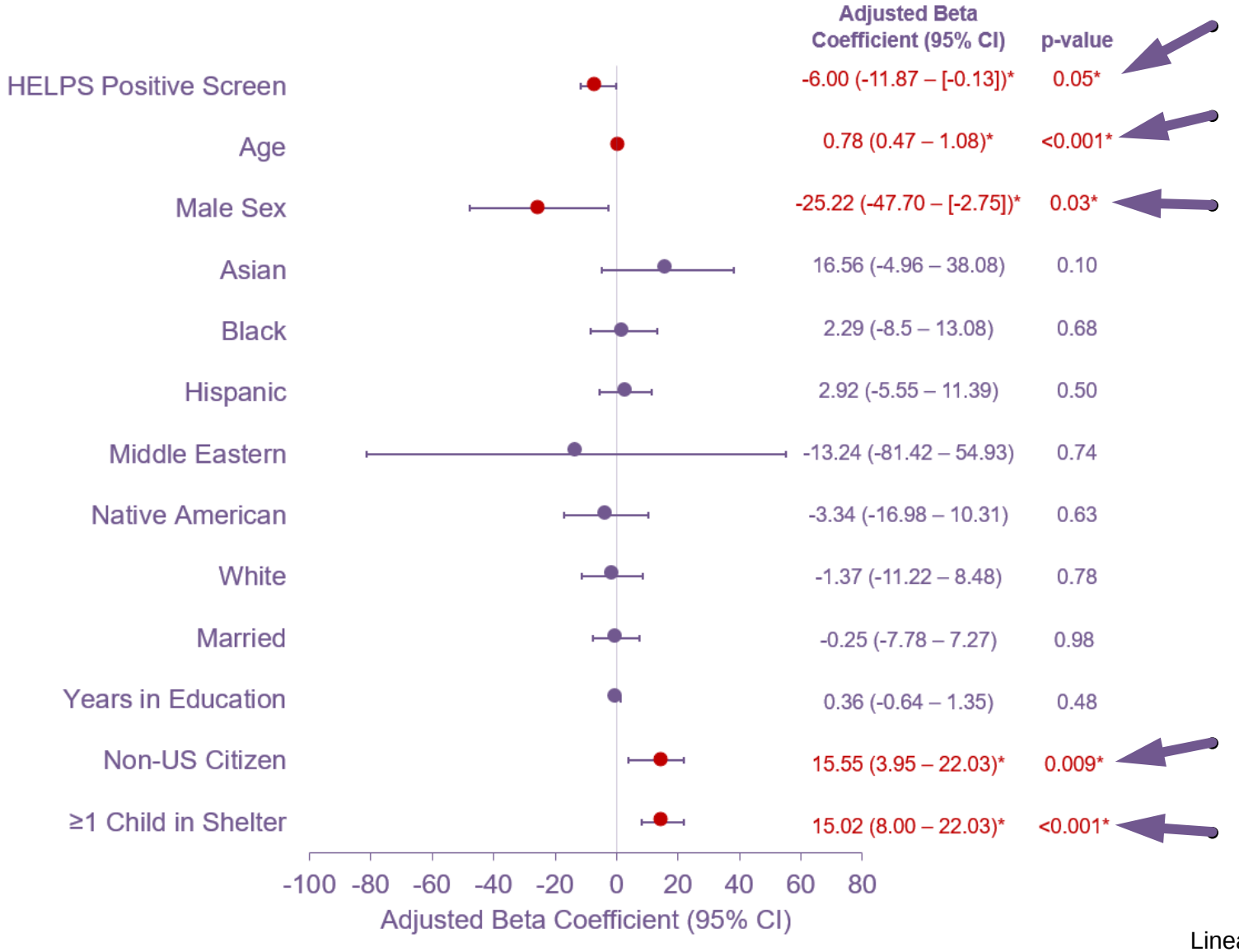
Cohort Descriptive Statistics

	Positive Screening (n = 515)	No Positive Screening (n = 573)	p-value[a]
Demographics:			
Age, mean (SD)	37.21 (10.30)	34.63 (10.43)	<0.001*
Reported Sex, n (%)			0.49
Female	505 (98.06)	565 (98.60)	
Male	10 (1.94)	8 (1.40)	
Race/Culture, n (%)			
Asian	12 (2.33)	11 (1.92)	0.68
Black	128 (24.85)	221 (38.57)	<0.001*
Hispanic	117 (22.72)	134 (23.39)	0.83
Middle Eastern	1 (0.19)	1 (0.17)	1.00
Native American	47 (9.13)	35 (6.11)	0.07
White	261 (50.68)	222 (38.74)	<0.001*
Marital Status, n (%)			0.95
Divorced/Separated/Single	416 (80.78)	462 (80.63)	
Married	99 (19.22)	111 (19.37)	
Years in Education, mean (SD)	12.41 (2.78)	11.96 (3.22)	0.01*
Citizen, n (%)			0.004*
Yes	485 (94.17)	512 (89.35)	
No	30 (5.83)	61 (10.65)	
At least one child in shelter, n (%)			0.49
Yes	122 (23.69)	146 (25.58)	
No	393 (76.31)	427 (74.52)	
Reported Health Issues:			
"Internal" Issue, n (%)	79 (15.34)	75 (13.09)	0.29
"External" Issue, n (%)	51 (9.90)	24 (4.19)	<0.001*
Psych/Neuro Issue, n (%)	130 (25.24)	103 (17.98)	0.004*
NA, n (%)	7 (1.36)	12 (2.09)	0.36

Individuals with positive HELPS screen:

- Older
- Less categorized as Black
- More categorized as White
- More educated
- Difference in proportion of citizens
- More "External" health issues
- More Psych/Neuro health issues

n = 1,088; *, statistically significant result for alpha level = 0.05; *a*, Two-sample t-test (continuous variables), Chi-square / Fisher's Exact test (categorical variables)



Positive HELPS Screening (6 days less)

Age (0.78 days more per 1-year increase)

Male Sex (25.22 days less)

Predictors of DV Shelter Length of Stay

Non-US Citizenship (15.55 days more)

≥1 Child in Shelter (15.02 days more)

Linear regression for days in shelter
*Indicates statistically significant result for alpha level = 0.05

n = 1,075

Lessons Learned

- Lack of standardized data collection limited analyses
- High prevalence of suspected TBI in shelter participants using HELPS
- Demographic and health disparities may exist in HELPS
- Intake data may predict shelter length of stay
- HELPS tool defines the past, whereas present symptoms would guide service allocation

Is there something better than HELPS?

J Head Trauma Rehabil
Vol. 37, No. 3, pp. E175–E185

OPEN

The Boston Assessment of Traumatic Brain Injury-Lifetime Semistructured Interview for Assessment of TBI and Subconcussive Injury Among Female Survivors of Intimate Partner Violence: Evidence of Research Utility and Validity

Catherine B. Fortier, PhD; Brigitta M. Beck, BA; Kimberly B. Werner, PhD; Katherine M. Iverson, PhD; Sahra Kim, PsyD; Alyssa Currao, MPH; Jennifer R. Fonda, PhD; Tara E. Galovski, PhD

Objective: To adapt the Boston Assessment of TBI-Lifetime (BAT-L) interview specifically for female survivors of intimate partner violence (IPV), validate the adapted BAT-L/IPV, and report the prevalence of head injury. **Setting:** The BAT-L is the first validated instrument to diagnose traumatic brain injuries (TBIs) throughout the life span for post-9/11 veterans. The BAT-L/IPV was adapted to target diagnostic issues belonging exclusively to IPV while maintaining its life span approach. **Participants:** Community-dwelling convenience sample of 51 female survivors of IPV with subthreshold ($n = 10$) or full diagnostic criteria ($n = 41$) of posttraumatic stress disorder. **Design:** Standard TBI criteria were evaluated using a semistructured clinical interview. **Main Measures:** The BAT-L/IPV is compared with the Ohio State University TBI Identification Method (OSU-TBI-ID) scoring approach as the criterion standard. **Results:** Correspondence between the BAT-L/IPV and the OSU-TBI-ID score was excellent (Cohen $\kappa = 0.86$; Kendall τ-b $= 0.89$). Sensitivity = 89.3% (95% CI, 81.2-97.4); specificity = 98.3% (95% CI, 95.0-100); positive predictive value = 98.0% (95% CI, 94.2-100); and negative predictive value = 90.6% (95% CI, 83.5-97.7). On the BAT-L/IPV, more than one-third (35.3%) of IPV survivors reported TBI secondary to an IPV-related assault, 76.5% reported IPV subconcussive head injury, 31.4% reported attempted strangulation, and 37.3% reported non-IPV TBI. **Conclusions:** The BAT-L/IPV performed well in diagnosing TBI in female IPV

DISCUSSION

The BAT-L/IPV demonstrates excellent diagnostic consistency with the criterion standard OSU-TBI-ID scoring method, indicating the BAT-L/IPV is an effective instrument for diagnosing TBI in populations with a history of IPV. The BAT-L was successfully adapted to create the BAT-L/IPV, a retrospective tool with which to probe, characterize, and diagnose an individual's lifetime and IPV-related exposure to TBI. The BAT-L/IPV is a more detailed, comprehensive semistructured interview designed specifically to characterize and diagnose head injuries that occur in the IPV context.

Journal of Neurotrauma
Volume 34, Number 4, 2017

https://doi.org/10.1089/neu.2016.4579

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Original Article

Traumatic Brain Injury in Domestic Violence Victims: A Retrospective Study at the Barrow Neurological Institute

Glynnis Zieman[1], Ashley Bridwell[2], and Javier F. Cárdenas[1]

A total of 208 patients were seen in the Barrow clinic from April 2012 through November 2015 via our community shelter partnership program.

Table 1. Demographic and Injury History

Characteristic	*Total (%)*
Female	109 (94.8)
Male	6 (5.2)
Age (mean)	37.9 ± 10.8[a]
Race	
Caucasian	64 (55.7)
Hispanic	29 (25.2)
African Americ n	18 (15.7)
American India	4 (3.5)
Abuse in childhoc d	44 (36.5)
Abuse *only* in c ildhood	17 (14.8)
Abuse in adulthoc d	98 (85.2)
Abuse *only* in a dulthood	73 (63.5)
Abuse in childhoc d and adulthood	27 (23.5)
Abusers	
Parent	39 (33.9)
Intimate partne	94 (81.7)
Other	20 (17.4)
>1	45 (35.7)
Psychiatric histor	
Total	97 (84.3)
Depression	69 (60)
Anxiety	54 (47)
Post-traumatic s tress disorder	13 (11.3)
Bipolar disorde	13 (11.3)
Other	10 (8.7)
Number of brain i juries	
1	14 (12.2)
>1	101 (87.8)
Too many to q antify	93 (80.9)
Loss of conscious ess	93 (80.9)
Sought medical c re for injuries	24 (20.9)
Follow-up	
Return to clinic	80 (69.6)
Compliant with medications	45/81 (56.6)
Completed MR	78/108 (72.7)
Psychiatry	21/45 (46.7)
Physical therap	22/34 (64.7)
Occupational therapy	3/7 (42.7)
Speech/cognitive therapy	21/48 (43.8)
Neuropsychology evaluation	19/30 (63.3)

[a]Standard deviation.

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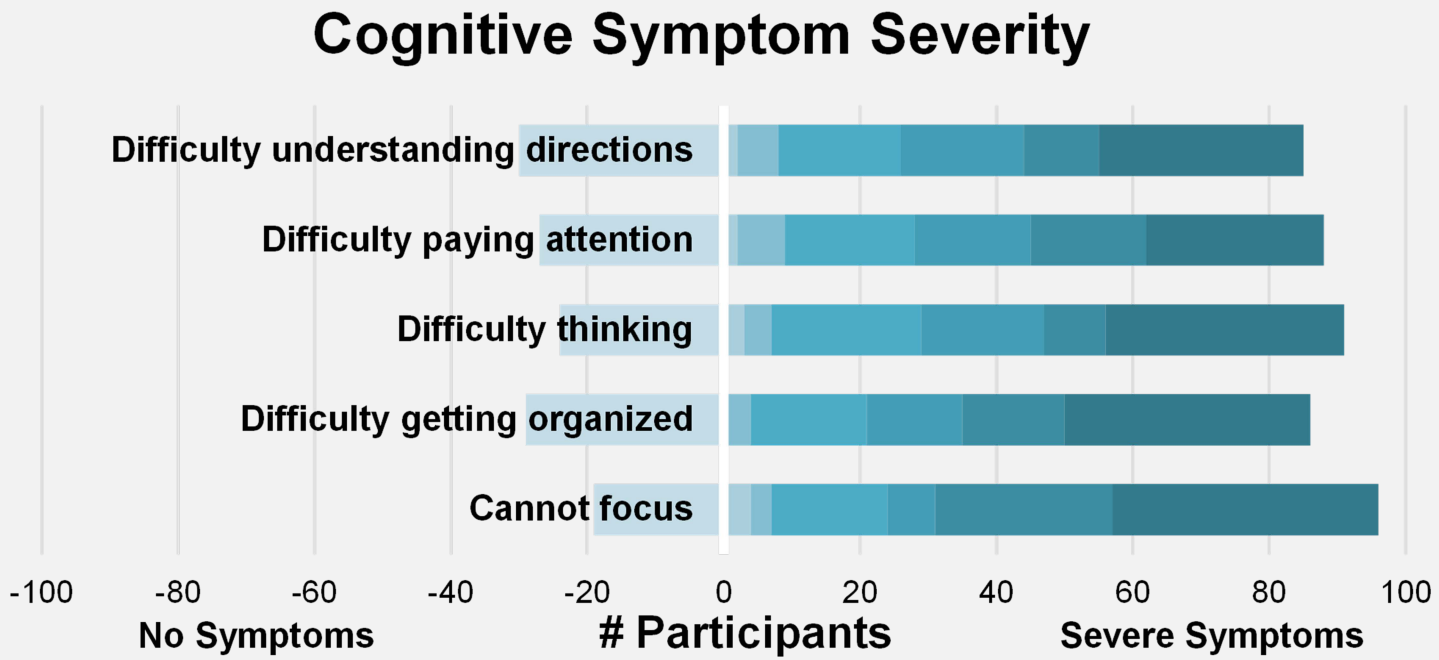

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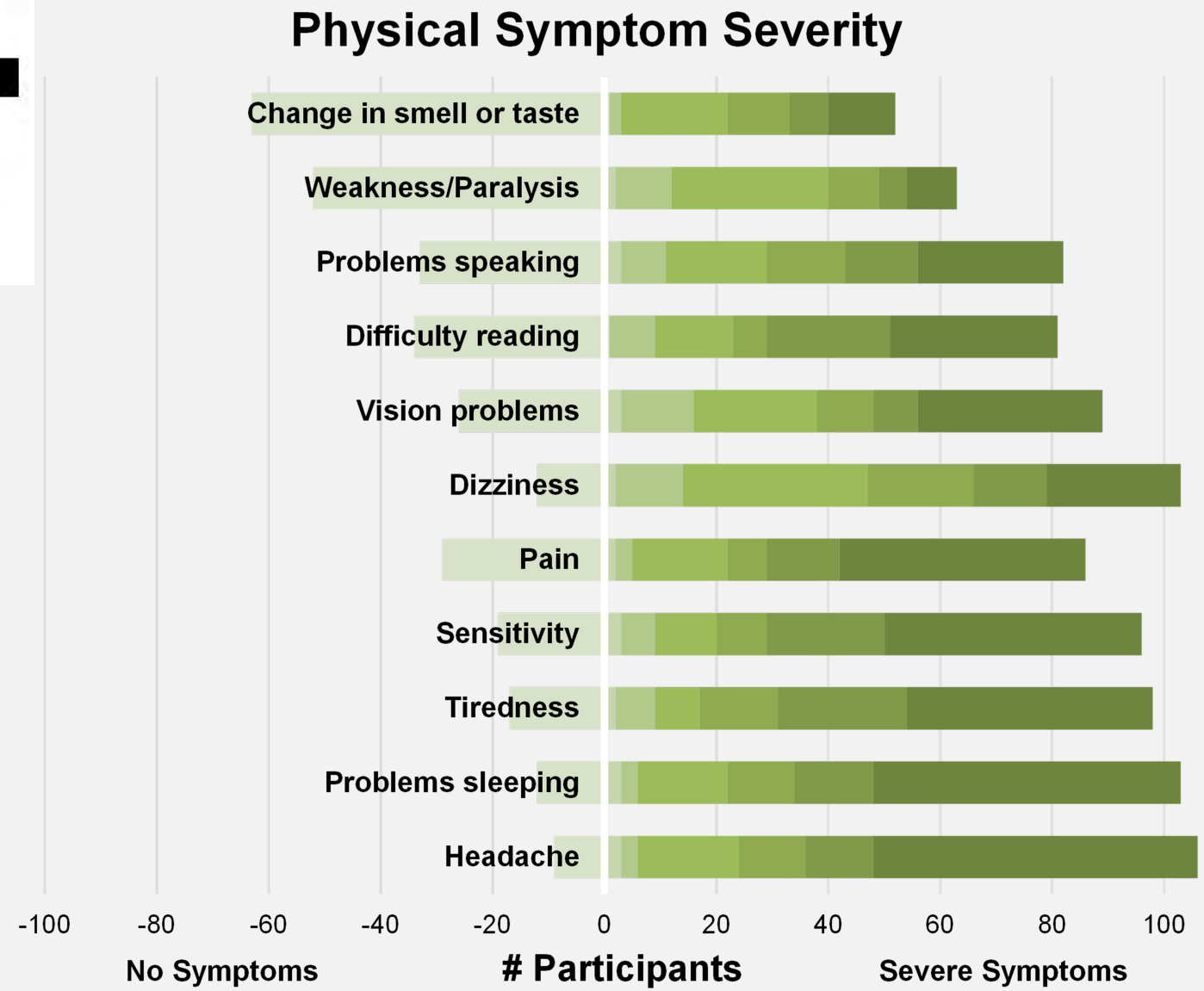

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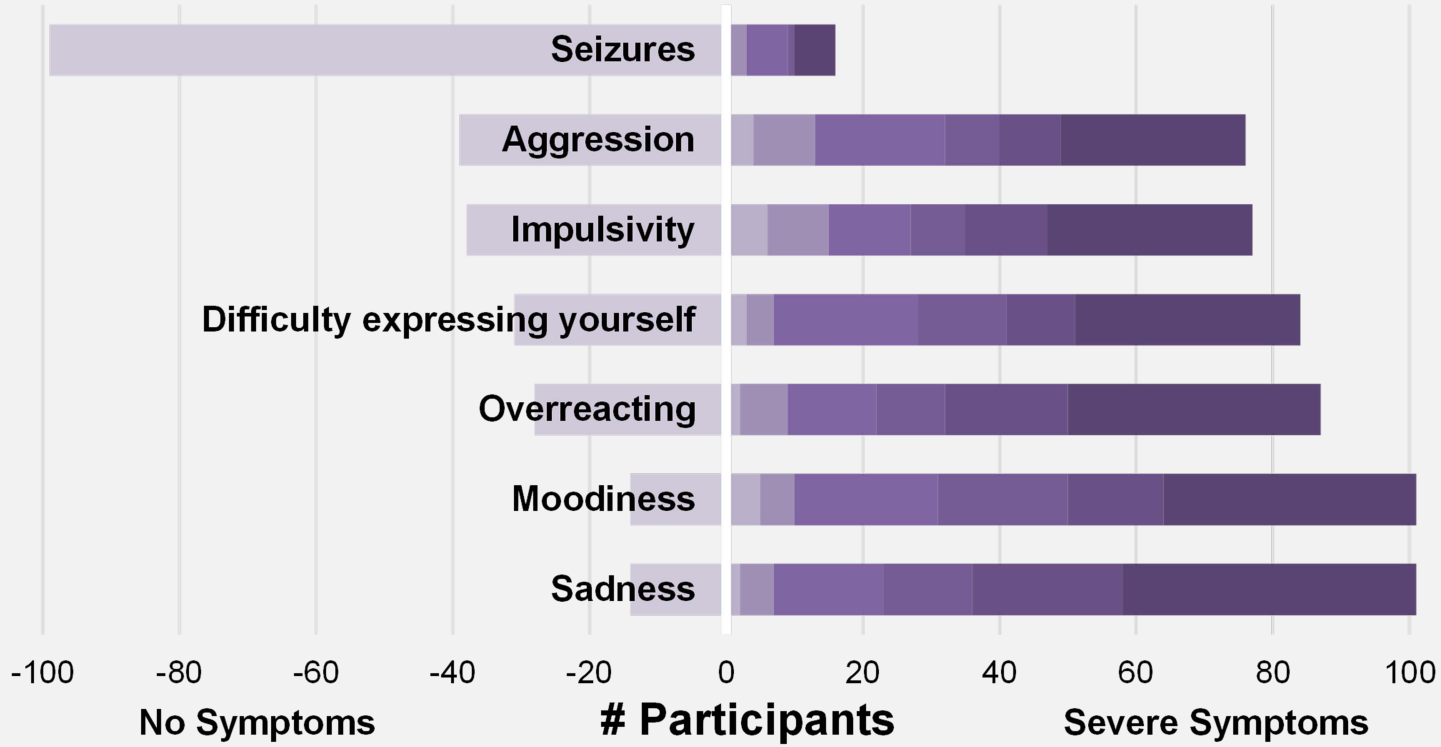

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Journal of Neurotrauma
XX:1–10 (XXXX XX, 2021)

DOI: 10.1089/neu.2021.0022

Journal of Neurotrauma

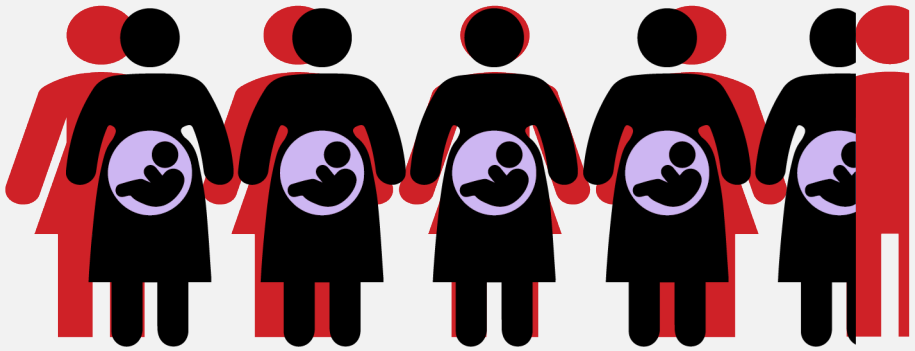
ORIGINAL ARTICLE CLINICAL STUDIES

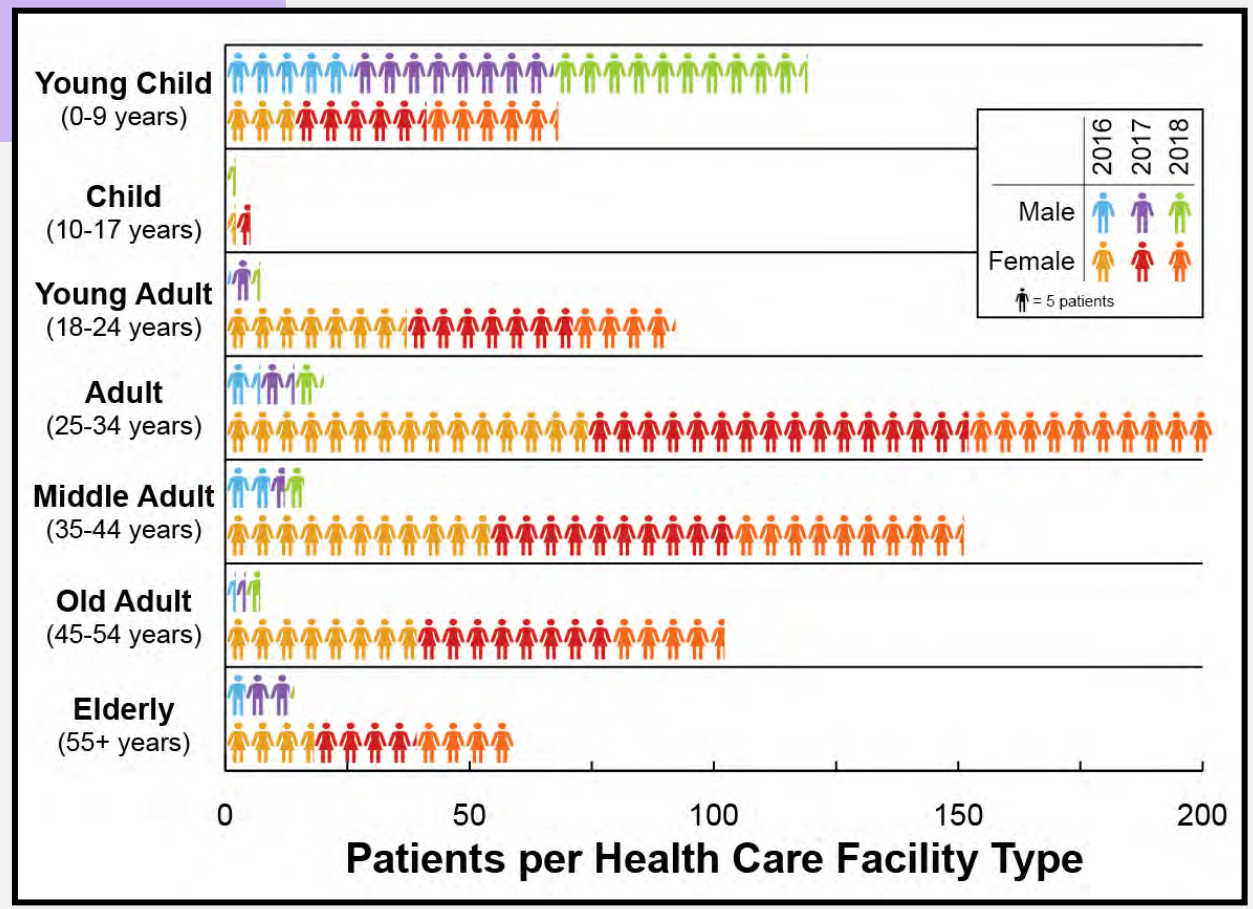
Population-Level Epidemiology of Concussion Concurrent with Domestic Violence in Arizona, USA

Rachel K. Rowe,[1-3,†] Sean M. Murphy,[2,4,†] Hirsch Handmaker,[4,5] and Jonathan Lifshitz[1-4,*]

ARIZONA DEPARTMENT OF HEALTH SERVICES

Concussion + DV diagnosis at licensed health care facilities in Arizona from 2016-2018 →
1,024 records
23 were also pregnant





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Battered and Pregnant: A Prevalence Study

ANNE STEWART HELTON, RN, MS, JUDITH MCFARLANE, RN, DRPH, AND ELIZABETH T. ANDERSON, RN, DRPH

Abstract: We interviewed 290 pregnant women randomly selected from public and private prenatal clinics, 80 per cent of whom were at least five months pregnant (ages 18–43, 42 per cent Latino, 22 per cent Black). Twenty-four women reported physical battering during this pregnancy (44 reported physical battering before the current pregnancy). Eight of the 24 pregnant women had sought medical treatment for injuries sustained; none reported having been assessed by prenatal care providers for abuse. (*Am J Public Health* 1987; 77:1337–1339.)

Introduction

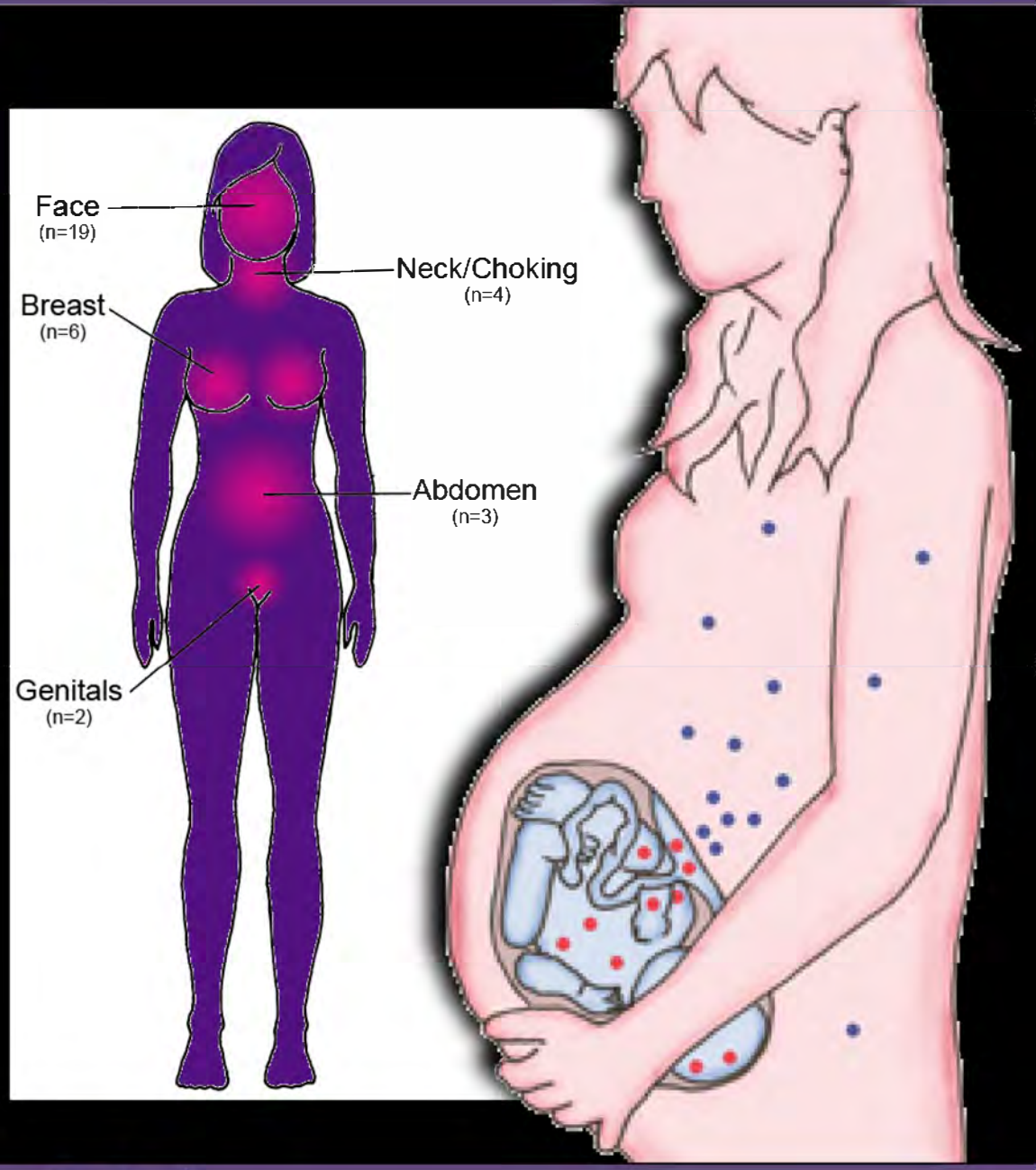
Physical battering of women is an underreported crime, associated with health consequences.[1–3] Estimates of the number of women battered each year range from 1.6 million[4] to 12 million.[5] It is thought that at least 25 to 30 per cent of

The sample of 290 Black, White, and Latino women ranged in age from 18 to 43 years; the average age of public clients was 25 years, that of the private clients was 28.5 years. The majority (70.6 per cent) of the sample was married; 58.3 per cent had graduated from high school; 25.8 per cent reported some college; and 22.4 per cent were employed. The racial and ethnic distribution of the total sample was as follows: Black, 22.4 per cent; Latino, 43.1 per cent; White, 32.1 per cent; American Indian or Asian, 2.4 per cent. Racial distribution of births for the metropolitan area was: Black, 27.6 per cent; Latino, 32.7 per cent; White, 35.2 per cent; and other, 4.5 per cent.[10] The modal month of pregnancy when interviewed was eight months, with 80 per cent of the women at least five months pregnant.

AJPH October 1987, Vol. 77, No. 10

TABLE 1—Characteristics of Women Battered during and before Pregnancy and Non-Battered Women

Characteristics	Battered during Pregnancy (n = 24)	Battered before Pregnancy (n = 44)	Non-Battered (n = 222)
Race/Ethnicity			
% Black	29.2	18.2	22.5
% Latino	33.3	52.3	42.4
% White	33.3	27.3	32.9
% Other	4.2	2.2	2.2
Mean Age (years)	23.6	26.5	26.4
% Married	71	66	71
% Employed	29	18	23
% High School Graduate	62	41	60



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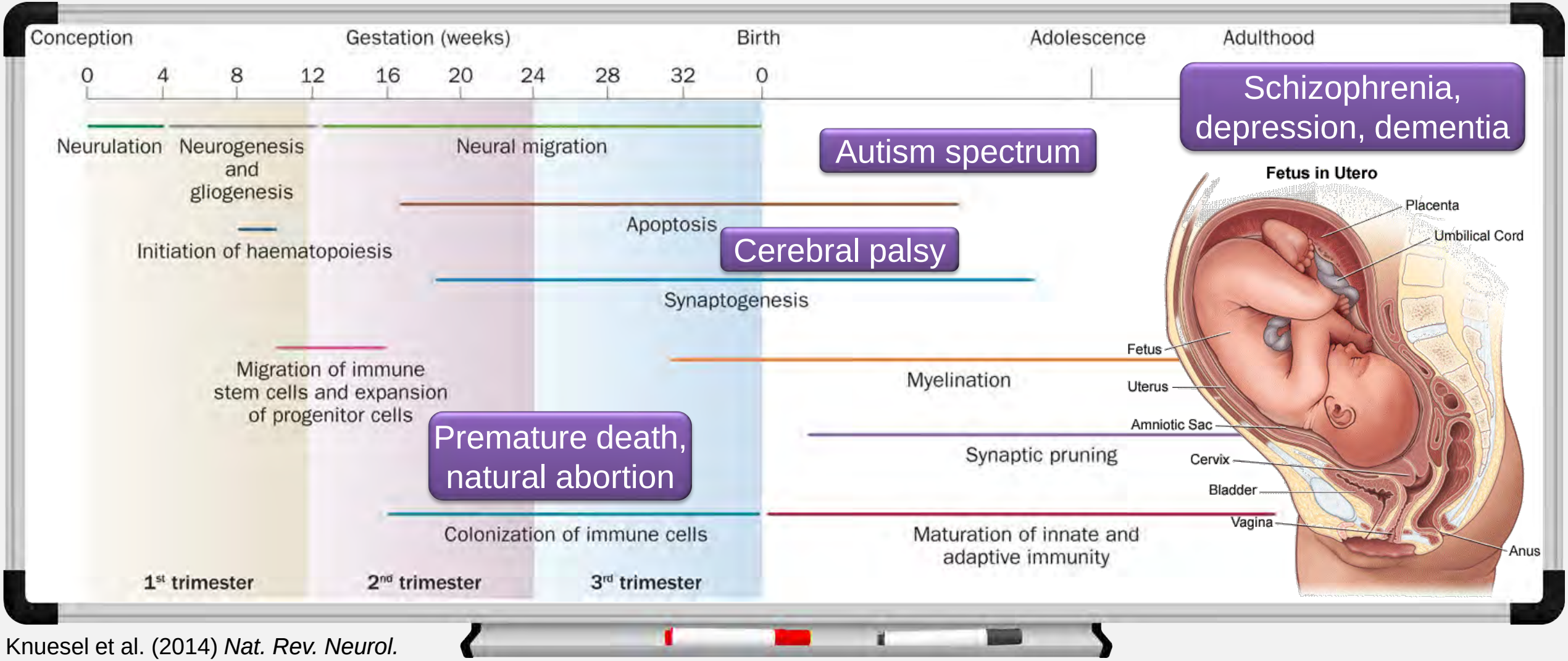
Neuroplacentology:

field that links placenta physiology and brain development



Knuesel et al. (2014) *Nat. Rev. Neurol.*

Journal of Neurotrauma
XX:1–19 (Month XX, 2021)

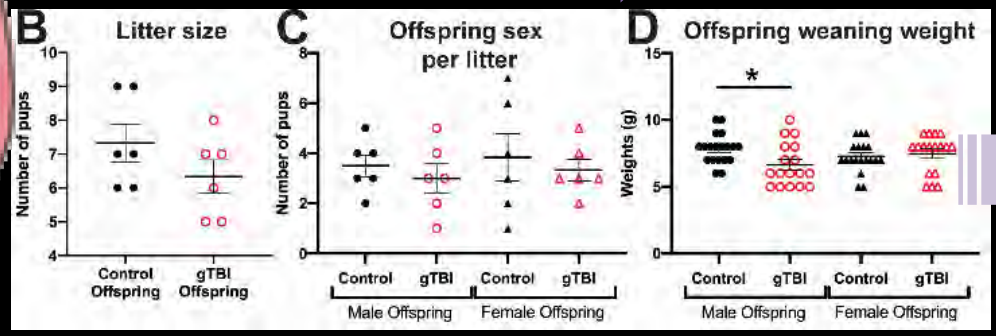
DOI: 10.1089/neu.2021.0048

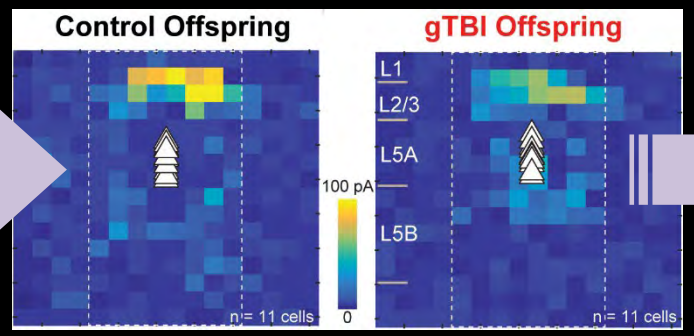
Journal of Neurotrauma

ORIGINAL ARTICLE

Mice Born to Mothers with Gravida Traumatic Brain Injury Have Distorted Brain Circuitry and Altered Immune Responses

Maha Saber,[1,2] J. Bryce Ortiz,[1,2,4] Luisa M. Rojas Valencia,[1,2,4] Xiaokuang Ma,[3] Bret R. Tallent,[1,2,4] P. David Adelson,[1,2] Rachel K. Rowe,[1,2,4] Shenfeng Qiu,[3] and Jonathan Lifshitz[1,2,4,*]





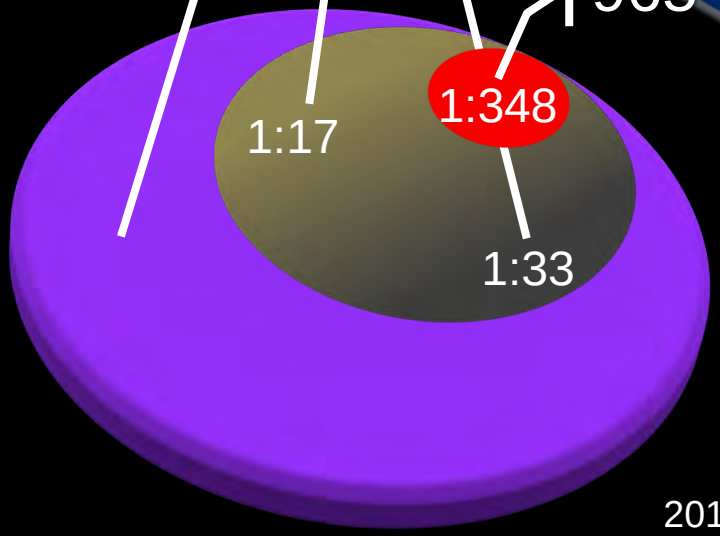
ARIZONA DEPARTMENT OF HEALTH SERVICES

336,028 Pregnancies

19,825 with documented DV

10,244 with documented TBI

965 with documented DV & TBI



2016-2020

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Berhanie *et al. Reproductive Health* (2019) 16:22
https://doi.org/10.1186/s12978-019-0670-4

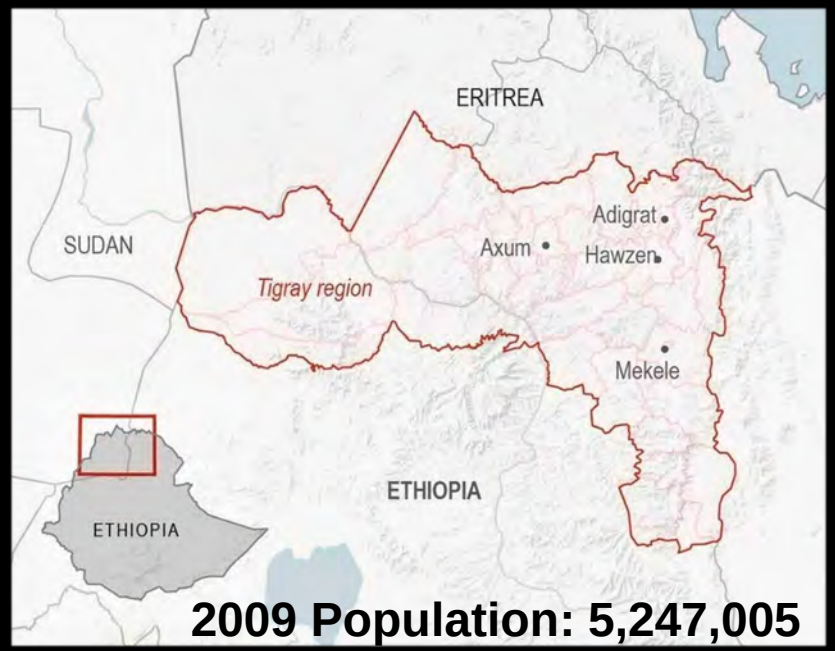
Reproductive Health

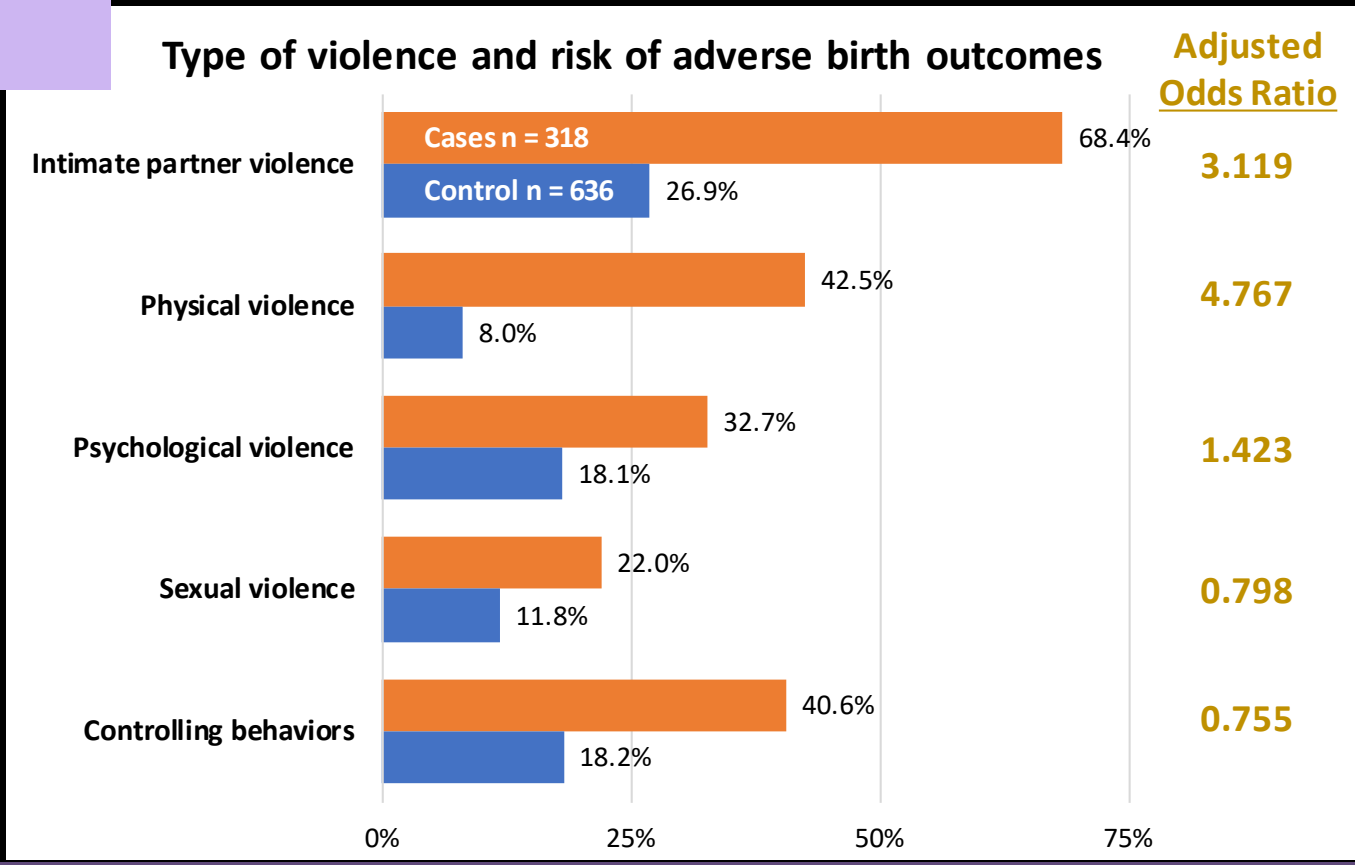
RESEARCH Open Access

Intimate partner violence during pregnancy and adverse birth outcomes: a case-control study

Eskedar Berhanie[1*], Dawit Gebregziabher[1], Hagos Berihu[1], Azmera Gerezgiher [2] and Genet Kidane[3]

Adverse birth outcomes: low birth weight (<2500 g), preterm birth (born before 37 weeks)
Cases: women who had adverse birth outcomes
Controls: women who had normal birth outcomes
Dates: January – March 2017





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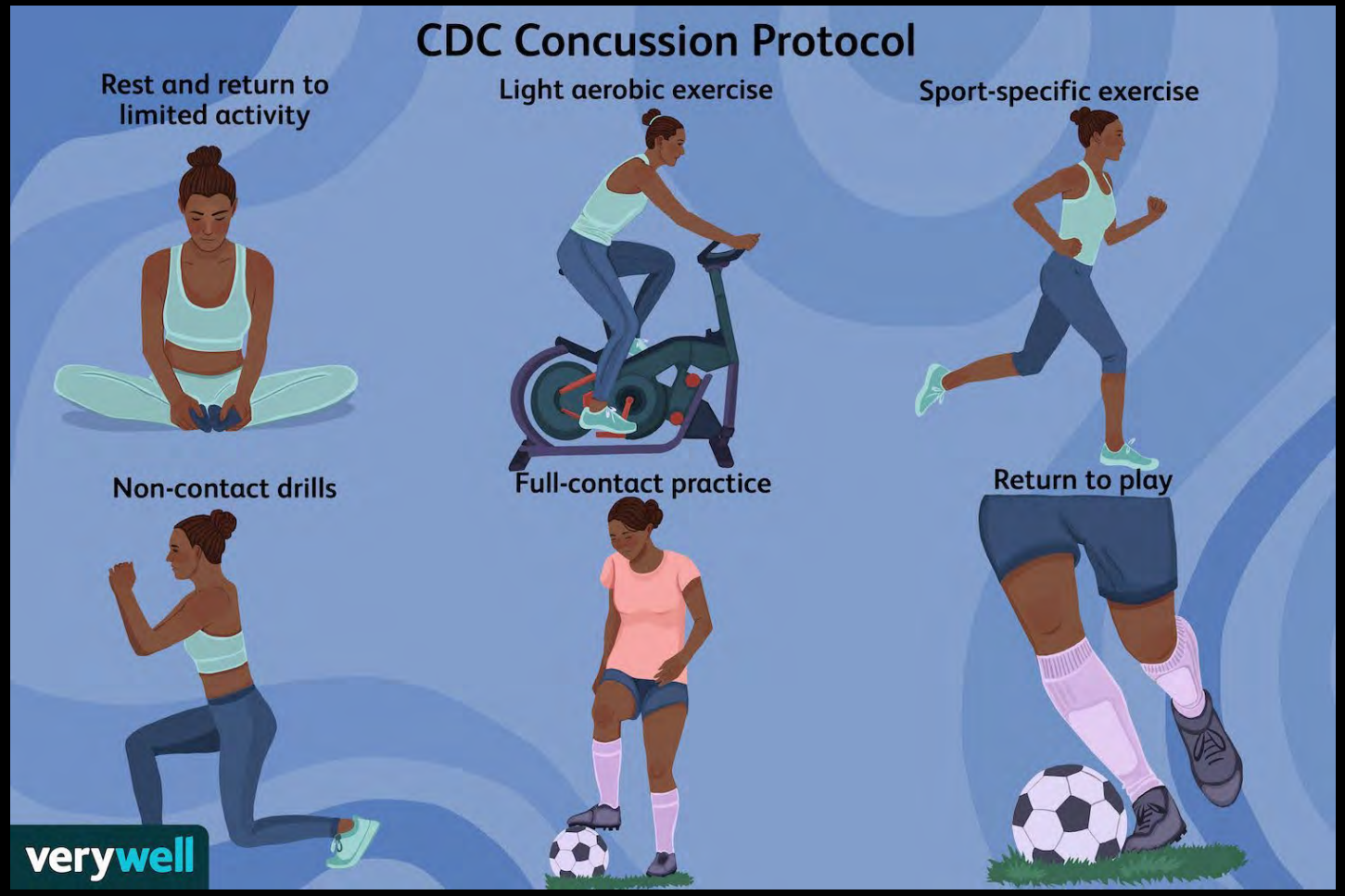
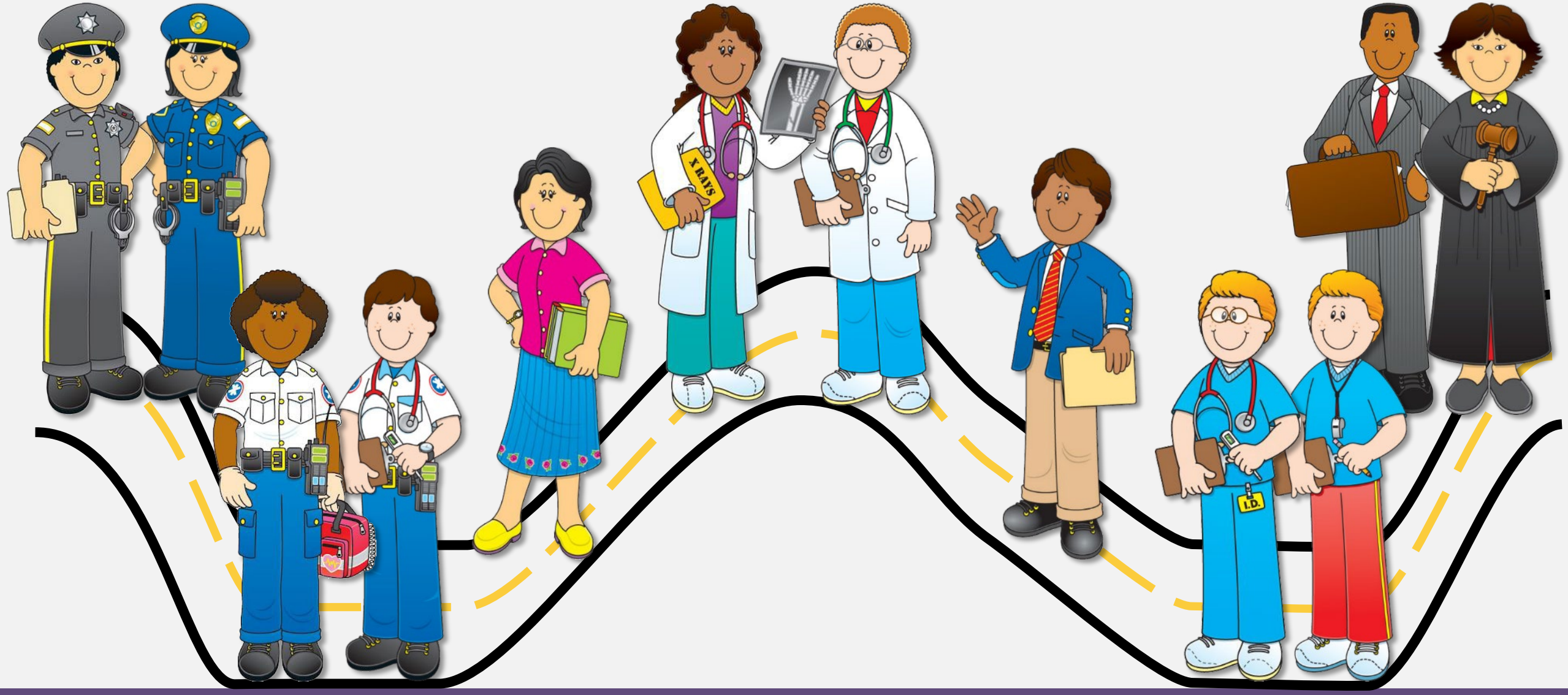
WHAT ABOUT TREATMENT?

Guidelines for graduated return to activity

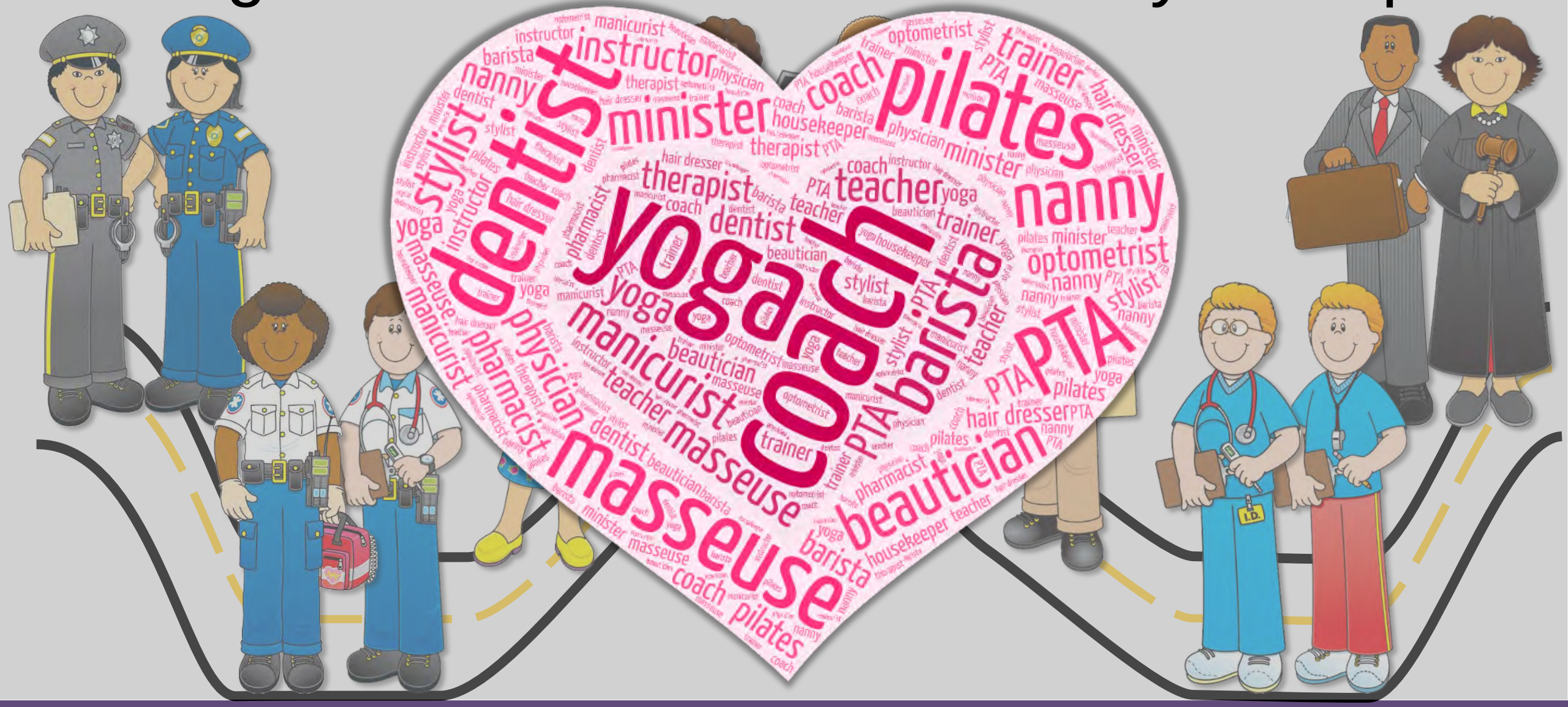


Confounding factors: drug use | alcohol use | sleepiness | dehydration | heat stroke | mental health | nutrition | genetics | hypertension

Management relies on a community of helpers



Management relies on a community of helpers



No head injury is too severe to despair of, nor too trivial to ignore.

Hippocrates

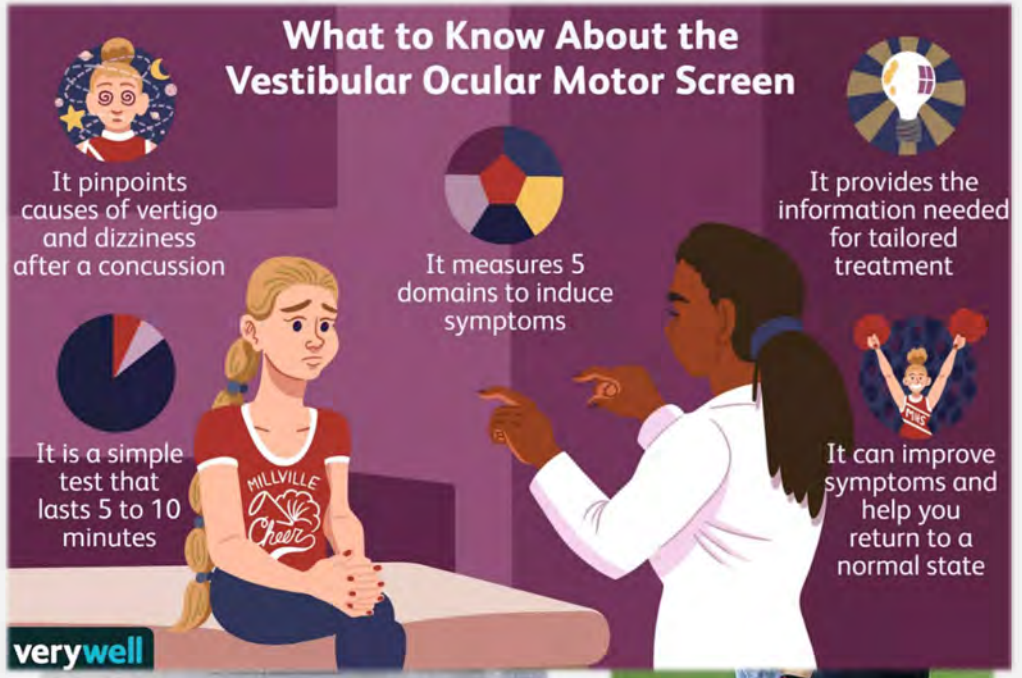
SCAT6™

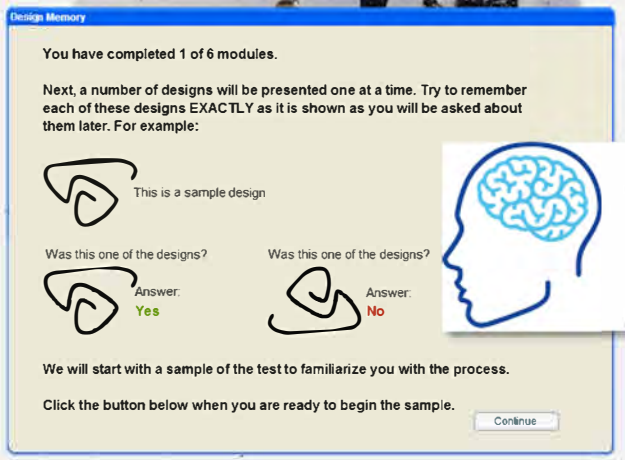
Sport Concussion Assessment Tool

For Adolescents (13 years +) & Adults

Developed by: The Concussion in Sport Group (CISG)

Supported by:





ImPACT® APPLICATIONS, INC.

SCAT6™

Sport Concussion Assessment Tool

For Adolescents (13 years +) & Adults

What is the SCAT6?

The SCAT6 is a standardised tool for evaluating concussions designed for use by Health Care Professionals (HCPs). The SCAT6 cannot be performed correctly in less than 10-15 minutes. Except for the symptoms scale, the SCAT6 is intended to be used in the acute phase, ideally within 72 hours (3 days), and up to 7 days, following injury. If greater than 7 days post-injury, consider using the SCOAT6/Child SCOAT6.

The SCAT6 is used for evaluating athletes aged 13 years and older. For children aged 12 years or younger, please use the Child SCAT6.

If you are not an HCP, please use the Concussion Recognition Tool 6 (CRT6).

Preseason baseline testing with the SCAT6 can be helpful for interpreting post-injury test scores but is not required for that purpose. Detailed instructions for use of the SCAT6 are provided as a supplement. Please read through these instructions carefully before testing the athlete. Brief verbal instructions for each test are given in *blue italics*. The only equipment required for the examiner is athletic tape and a watch or timer.

Recognise and Remove

A head impact by either a direct blow or indirect transmission of force to the head can be associated with serious and potentially fatal consequences. If there are significant concerns, which may include any of the Red Flags listed in Box 1, the athlete requires urgent medical attention, and if a qualified medical practitioner is not available for immediate assessment, then activation of emergency procedures and urgent transport to the nearest hospital or medical facility should be arranged.

Completion Guide

Orange: Optional part of assessment

Key Points

- Any athlete with suspected concussion should be REMOVED FROM PLAY, medically assessed, and monitored for injury-related signs and symptoms, including deterioration of their clinical condition.
- No athlete diagnosed with concussion should return to play on the day of injury.
- If an athlete is suspected of having a concussion and medical personnel are not immediately available, the athlete should be referred (or transported if needed) to a medical facility for assessment.
- Athletes with suspected or diagnosed concussion should not take medications such as aspirin or other anti-inflammatories, sedatives or opiates, drink alcohol or use recreational drugs and should not drive a motor vehicle until cleared to do so by a medical professional.
- Concussion signs and symptoms may evolve over time; it is important to monitor the athlete for ongoing, worsening, or the development of additional concussion-related symptoms.
- The diagnosis of concussion is a clinical determination made by an HCP.
- The SCAT6 should NOT be used by itself to make, or exclude, the diagnosis of concussion. It is important to note that an athlete may have a concussion even if their SCAT6 assessment is within normal limits.

Remember

- The basic principles of first aid should be followed: assess danger at the scene, athlete responsiveness, airway, breathing, and circulation.
- Do not attempt to move an unconscious/unresponsive athlete (other than what is required for airway management) unless trained to do so.
- Assessment for a spinal and/or spinal cord injury is a critical part of the initial on-field evaluation. Do not attempt to assess the spine unless trained to do so.
- Do not remove a helmet or any other equipment unless trained to do so safely.

For use by Health Care Professionals Only — SCAT6™

Developed by: The Concussion in Sport Group (CISG)

Supported by

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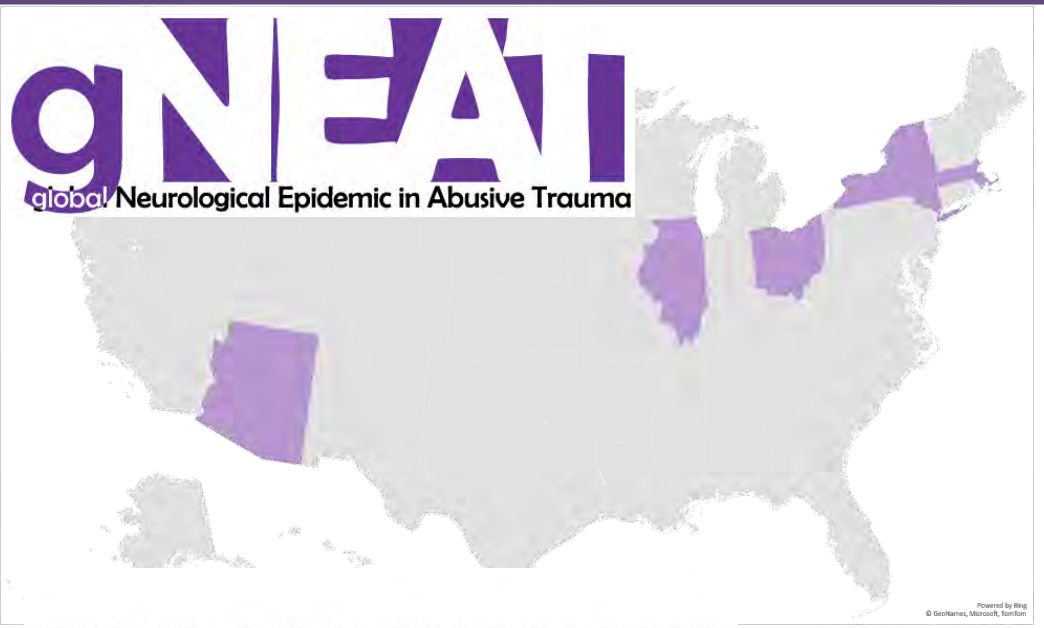
gNEAT
global Neurological Epidemic in Abusive Trauma



The New York Times Magazine

Dannielle Bowman for The New York Times

The Hidden Epidemic of Brain Injuries From Domestic Violence

Research shows that survivors of abuse can sustain head trauma more often than football players. But they are almost never diagnosed.

By CHRISTA HILLSTROM

The 3.6.22 Issue

PINK CONCUSSIONS
Partner-Inflicted Brain Injury Task Force

pinkconcussions.com/violence

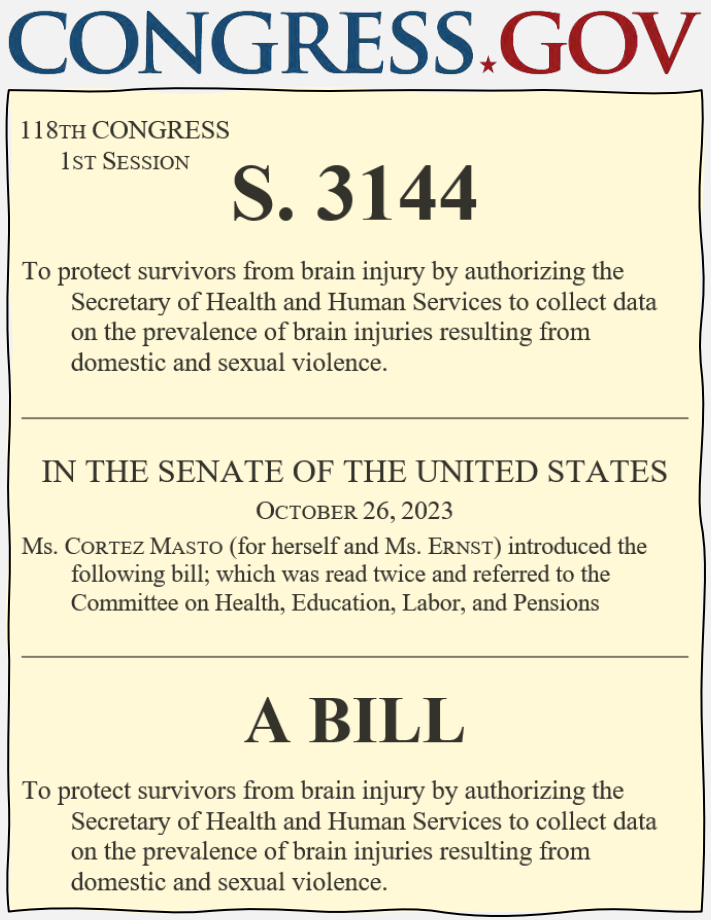
MC3DV
Maricopa County Collaboration on Concussion from Domestic Violence

VA | U.S. Department of Veterans Affairs
Veterans Health Administration
Phoenix VA Health Care System

College of Medicine
Phoenix

Call to Action

- Americans can lead societal change by:
  - Supporting research into the epidemiology of IPV-related TBI
  - Deliver social services to support victims and their families
  - Fund therapeutic trials for victims to recover from TBI-related deficits
  - Education about civil discourse in interpersonal relationships
- Leadership is needed from cultural icons, such as athletes and celebrities, to raise awareness.
- Action is needed from legislators to enact zero tolerance policies against abuse that results in neurological impairment.
- NOTE: Perpetrators among society may hinder progress



CONGRESS.GOV

118TH CONGRESS
1ST SESSION

S. 3144

To protect survivors from brain injury by authorizing the Secretary of Health and Human Services to collect data on the prevalence of brain injuries resulting from domestic and sexual violence.

IN THE SENATE OF THE UNITED STATES

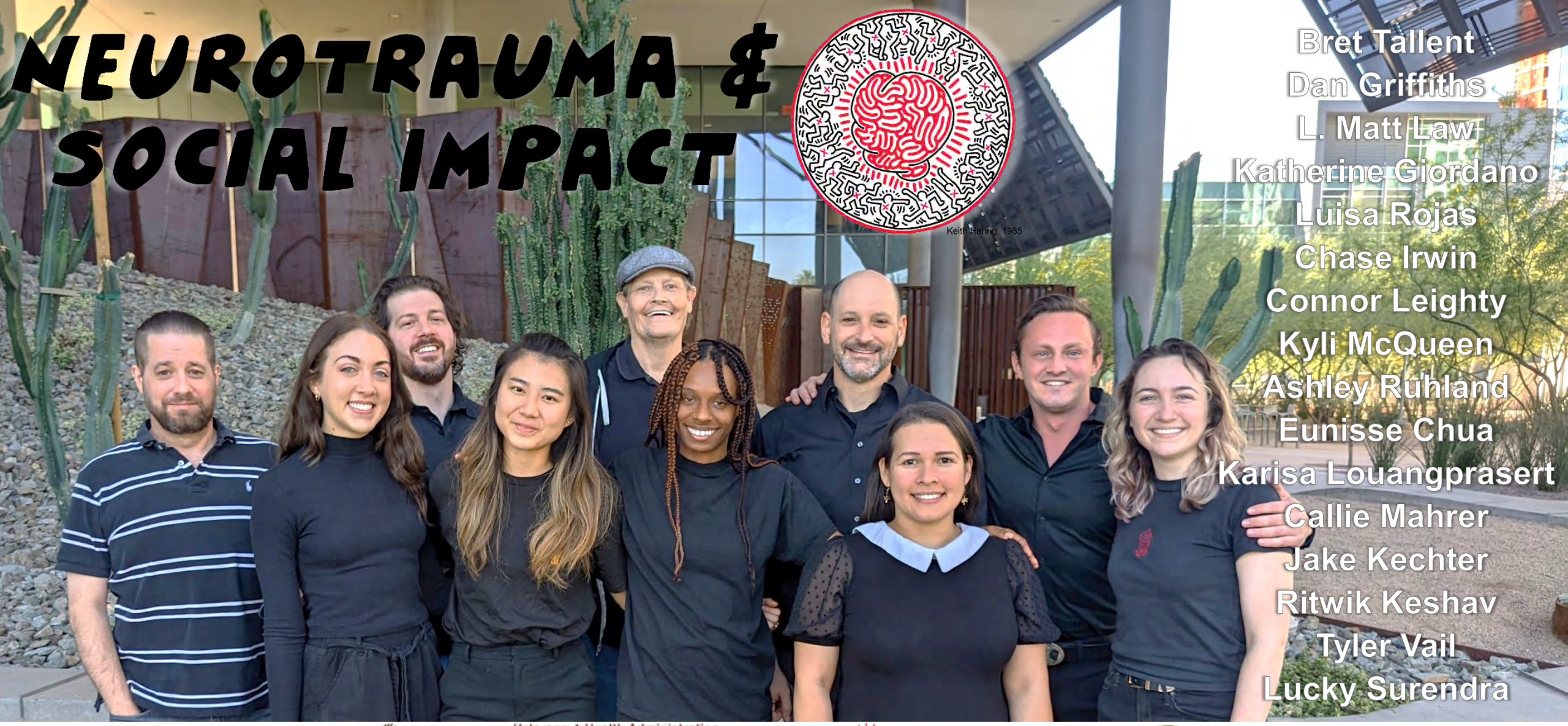
OCTOBER 26, 2023

Ms. CORTEZ MASTO (for herself and Ms. ERNST) introduced the following bill; which was read twice and referred to the Committee on Health, Education, Labor, and Pensions

A BILL

To protect survivors from brain injury by authorizing the Secretary of Health and Human Services to collect data on the prevalence of brain injuries resulting from domestic and sexual violence.

NEUROTRAUMA & SOCIAL IMPACT



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