

The Development and Use of the Virginia Brain Injury Screening Tool



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- ▶ The contents are the sole responsibility of the authors and do not necessarily represent the official views of CNI Trust Fund or of DARS.

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Patricia Goodall, Ed.S.
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Screening for TBI: Public Health Responsibility

- ▶ "Identification of TBI is particularly important when the injury results in continuing symptoms (chronic TBI) that can lead to reduced productivity, poor community integration, and other social problems." *Dams-O'Connor, et al., 2014, p. 480*
- ▶ "History of TBI is rarely queried in primary care or other health service and educational settings.
 - ▶ Its symptoms (if reported) may be inappropriately attributed to other causes such as aging, depression, or in schools, to learning or emotional disabilities." *Gordon, et al., 1998, 2013 [As quoted in Dams-O'Connor et al., 2014, p.480]*

Screening for TBI: Public Health Responsibility

- ▶ Failure to recognize the etiology of these symptoms precludes appropriate treatment or symptom management.

Yi & Dams-O'Connor, 2013 [As quoted in Dams-O'Connor et al., 2014, p.480]

Project Goals

- ▶ Why did we attempt to identify or develop a TBI/ABI screening measure (PURPOSE)?
 - ▶ To help community health services agencies identify clients with self-reported history of TBI/ABI
 - ▶ To provide some information regarding whether the history of TBI/ABI might be contributing to current challenges.
 - ▶ To provide information on resources for staff to provide to identified clients.

Project Goals

- ▶ What should the TBI/ABI screening measure look like (UTILITY)?
 - ▶ Brief, easy to administer
 - ▶ Should not require extensive training
 - ▶ Provides the following information:
 - ▶ Determination of whether a client has a TBI/ABI history
 - ▶ Information about the severity of the TBI
 - ▶ Symptoms related to the TBI/ABI
 - ▶ General diagnostic information to guide referrals

Scope of Work (Three year grant project period)

- ▶ Initiate a formal literature review to identify screening tools for use by non-brain injury services providers to identify those with a history of brain injury.
 - ▶ If appropriate measures not identified, a screening tool may be developed.
- ▶ Development of resources for non-brain injury professionals on implementing a brain injury screening protocol.

Literature Review

- ▶ Ovid Medline and Pub Med search engines:
 - ▶ 124,107 brain injury citations
 - ▶ 109,860 community mass screening citations
 - ▶ 83, 234 TBI citations
 - ▶ 76,746 ABI citations
 - ▶ 136 Combination citations (Combining either Brain Injury, TBI, or ABI “AND” community mass screening
 - ▶ 12 relevant screening articles were identified and reviewed

Literature Review

- ▶ TBI screening instruments used in other states were also reviewed to assess their relevance for the Commonwealth of Virginia Community Based Brain Injury Screening Initiative.

Literature Review

- ▶ A total of 26 screening instruments were reviewed and evaluated based on these variables:
 - ▶ Source of instrument
 - ▶ TBI and/or ABI focus/inclusion
 - ▶ Description
 - ▶ Checklist
 - ▶ Interview format
 - ▶ Mental status or neuropsychological measure
 - ▶ Number of items
 - ▶ Intended population
 - ▶ Administration time
 - ▶ Advantages of the instrument
 - ▶ Disadvantages of the instrument

Reviewed Instruments

TBI/ABI Measures		
Brain Injury Screening Questionnaire	Brief Screening for Possible Brain Injury	TBI Screening
DVBIC 3 Question Brief TBI Screen	Columbus Public Schools Brain Injury Screen	Brief TBI Screening
MCV TBI Symptom Checklist	Colorado State Acquired Brain Injury School Age	New Mexico Brain Injury Screening Form
TIRR Symptom Checklist	Iowa Head Injury Screening Instrument	Boston Assessment of Brain Injury Lifetime (BAT-L)
HELPS Brain Injury Screening Tool	Maryland TBI Screening	Acute Concussion Evaluation (ACE)
Ohio State U TBI ID Method	Texas Brain Injury Screening	Minnesota Brain Injury Identification
MoCA	DVBIC Post Deployment Screening	
RBANS	Alaska Screening Tool	
MMSE	Amen Brain System Checklist	
TBI Questionnaire	Kansas Dept. of Aging Checklist	

Selected Instruments

- ▶ Ohio State University TBI Identification Method (Corrigan et al.)
 - ▶ Interview Form
 - ▶ 20-30 minute administration time
- ▶ Brain Injury Screening Questionnaire (Dams-O'Connor et al., Icahn School of Medicine at Mount Sinai; personal communication with Dr. Wayne Gordon)
 - ▶ 10-15 minute administration
- ▶ Both have many advantages
 - ▶ Provide rich clinical detail
 - ▶ TBI specific
 - ▶ Too unwieldy and/or time consuming for use by non-brain injury services providers

Next Steps After Review of Existing Measures

- ▶ Develop a new screening tool for use with clients receiving services from non-brain injury providers.
- ▶ Identify community programs for the pilot study with Patti Goodall & Donna Cantrell of DARS
- ▶ Develop the methodology for the pilot study
- ▶ Develop submission for Institutional Review Board (IRB) review and submit to the UVA IRB for Social and Behavioral Sciences.

Project Implementation

- ▶ Identification of and implementation of screening in 9 pilot sites across Virginia:
 - ▶ 3 Area Agencies on Aging (AAA)
 - ▶ 1 Center for Independent Living (CILs)
 - ▶ 3 Community Services Boards (CSBs)
 - ▶ 2 Free and Charitable Clinics (FCC)

VBIST Development

- ▶ Developed questions to screen for TBI and ABI
- ▶ Determined additional questions to identify potential persisting TBI/ABI related symptoms
- ▶ Received feedback from participating agencies on demographic questions and phrasing of items
- ▶ Revised VBIST based on feedback
- ▶ VBIST reviewed by brain injury experts
 - ▶ Anthony Giuliano, PhD, U Mass Medical School
 - ▶ Austin Errico, PhD, Qualified Brain Injury Support Provider
- ▶ After ten revisions, the current VBIST was finalized.

Institutional Review Board (IRB)

- ▶ Submitted protocol for review by the UVA IRB for Social and Behavioral Sciences (SBS)
 - ▶ Required consent for agency clients to participate
 - ▶ Did not want the consent process to be so onerous that it was a burden to agency staff
 - ▶ UVA SBS-IRB allowed verbal consent
 - ▶ Training provided to agency sites included discussion of the importance of obtaining client consent

VBIST Training & Demonstration Webinars with Pilot Agencies

- ▶ Discuss the consent process
- ▶ Review the VBIST
- ▶ Qualtrics electronic survey system
- ▶ Paper version
- ▶ Data collection began on August 8, 2018
 - ▶ Ended on February 7, 2019

Consent Process

Virginia Brain Injury Screening Tool (VBIST)

The following questions are part of a study being conducted by the Department of Aging and Rehabilitation Services and the University of Virginia and funded by the Commonwealth Neurotrauma Initiative. The answers to these questions will help DARS better understand the needs of agency clients who might benefit from additional services.

It is optional for clients to participate and answer these questions. Given that the client receives services from this agency, it is important that the client feel comfortable declining participation or stopping the VBIST at any point without penalty. If the client seems hesitant to participate, do not proceed.

Please read the following information to the client:

Purpose of the research study: To develop a screening process to identify clients who might have experienced a traumatic brain injury or acquired brain injury. We have developed a short screening tool for agency providers to use and we want to know more about how easy it is for the providers to use this tool.

What you will do in the study: If you agree to participate, your provider will ask you a few additional questions about your medical history. You can skip any questions that you do not want to answer and you can stop the interview at any time. Your name and other identifying information will not be collected. Your provider will only record your age and gender on the form. Your responses will be entered into a database and summarized by agency.

Time required: The study will require about 5 minutes of your time.

Risks: There are no anticipated risks in this study.

Benefits: There are no direct benefits to you for participating in this research study. The study may help us understand more about the number of clients with a history of traumatic brain injury or acquired brain injury with the goal of increasing knowledge of clients with these injuries and the need for additional community services.

Confidentiality: The information that you give in the study will be handled confidentially. Your data will be anonymous which means that your name will not be collected or linked to the data.

Voluntary participation: Your participation in the study is completely voluntary. Your treatment or service at this agency will not be affected if you choose not to participate.

Right to withdraw from the study: You have the right to withdraw from the study at any time without penalty.

How to withdraw from the study: If you want to withdraw from the study, tell the interviewer to stop the interview. There is no penalty for withdrawing.

Payment: You will receive no payment for participating in the study.

Do you agree to participate? Yes No

Agency Type # ___

Agency Study Identifier# _____

Virginia Brain Injury Screening Tool (VBIST)

The Centers for Disease Control (CDC) defines a traumatic brain injury (TBI) "as a disruption in the normal function of the brain that can be caused by a bump, blow, or jolt to the head, or penetrating head injury." Immediate symptoms may include loss of consciousness, feeling dazed or confused, thinking difficulties headache, dizziness, nausea or vomiting, and sensitivity to light and/or sound. A TBI can be mild, moderate, or severe in nature.

Client Age: _____

Client Gender: F M Transgender M Transgender F Non-binary Other

1. Have you ever had a traumatic brain injury (TBI)?

Yes No (If no, skip to question 2)

- What caused your TBI (mechanism of injury)? [Please check the box]

→ If patient had more than one TBI, ask them to provide information about their most serious injury.

- Falls
- Car accident
- Bicycle accident
- Hit by a vehicle while crossing or standing near a street (pedestrian)
- Hit in the head with a heavy object (blunt trauma)
- Exposed to blast forces in the military (blast injury)
- Partner violence
- Sports or recreational activity (sports team or activities like skiing, skateboarding, riding a horse)
- Other _____

Were you knocked out (unconscious) or in a coma?

Yes No

If yes, for how long?

1 to 30 minutes 31 to 60 minutes More than 60 minutes

2. Have you ever had any kind of other brain condition, event, or disorder diagnosed by a doctor such as any of the following? No If yes, please specify below:

- Stroke
- Seizures
- Loss of oxygen to the brain (near drowning, near suffocation, etc)
- Brain Infections
- Brain Tumor
- Dementia: Loss of memory and other mental abilities caused by brain changes, and resulting in interference with daily life. This includes Alzheimer's and other types of dementia.



IF YOU ANSWERED NO TO QUESTIONS 1 AND 2, STOP HERE
A Project of the Virginia Department of Aging and Rehabilitative Services

Agency Type # ___

Agency Study Identifier# _____

IF YOU ANSWERED YES TO EITHER QUESTION 1 OR 2, PLEASE CONTINUE

3. Do you currently have any problems or issues with your thinking from this brain injury, condition, event, or disorder?

Yes No

If yes, check off any symptoms reported by the patient:

- Memory
- Attention/Concentration
- Language/Speech
- Problem-Solving/Thinking
- Doing more than one thing at a time (multi-tasking)
- Other _____

4. Do you currently have any physical problems or issues from this brain injury, condition, event, or disorder?

Yes

No

If yes, check off any symptoms reported by the patient:

- Nausea
- Fatigue
- Balance/dizziness/walking
- Weakness or numbness in your hands, arms, or feet
- Trouble with your vision or hearing
- Pain, including headaches, neck pain, and/or body pain
- Sensitivity to light and/or sound
- Not getting enough sleep or sleeping too much
- Other _____

5. Do you currently have any emotional problems or issues that you think are due to your brain injury, condition, event, or disorder?

Yes

No

If yes, check off any symptoms reported by the patient:

- Depression
- Thoughts of hurting or killing yourself or attempts to hurt or kill yourself
- Anxiety or trouble with your nerves
- Post-traumatic stress disorder (PTSD)
- More emotional, such as a "short fuse," getting irritated easily or being more tearful
- Seeing or hearing things that others don't see or hear (hallucinations)
- Difficulty trusting others, feeling suspicious of others' motives
- Other _____

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Resources for Persons with Brain Injury



SERVICES FOR PEOPLE WITH BRAIN INJURY IN VIRGINIA

7/2018

State Contracted Programs/Services: *The following organizations receive Commonwealth of Virginia state general funds to provide programs/services through contracts managed by the Department for Aging and Rehabilitative Services (DARS):*

If there is no local Brain Injury Services (BIS) Provider in your area, contact BIAV for help identifying possible resources statewide.

Brain Injury Association of Virginia (BIAV) provides **statewide** information and support to people with brain injury, family members, and professionals. BIAV services include a toll-free help-line, an information clearinghouse and resource library, referrals to brain injury-specific and general community resources, technical assistance to a statewide network of support groups, systems advocacy, educational events, and an adult camp for survivors. Contact Anne McDonnell, Executive Director, Brain Injury Association of Virginia, 1506 Willow Lawn Drive, Suite 212, Richmond, VA 23230, by phone 804/355-5748, Toll-free Help Line 800/444-6443, e-mail info@biav.net, or on-line <http://www.biav.net>.

Brain Injury Services, Inc. (BIS INC) provides information and referral and case management for adults and children in **Northern Virginia**. Additional services include: supported living, counseling, assistive technology and vocational services for adults with brain injuries in **Northern Virginia**; case management is also available in the **Fredericksburg** area for adults, children and adolescents and for adults in the **Winchester** area. BIS INC also operates two clubhouse / day programs: The Adapt Clubhouse (in **Fairfax**) and Community Outreach Services (in **Fredericksburg**). Contact Denise Hyater, Executive Director, Brain Injury Services, Inc., 8136 Old Keene Mill Road, Suite B102, Springfield, VA 22152, by phone 703/451-8881, e-mail dhvater@braininjurysvcs.org, or on-line <http://www.braininjurysvcs.org>.

Preliminary Data*

- ▶ 542 clients approached
 - ▶ 409 consented to participate
 - ▶ 408 answers to some questions
 - ▶ 133 declined participation
 - ▶ 75% participation rate

- ▶ *Data collection is complete; still doing final check of data integrity

Participation Rate by Agency Type

- ▶ Area Agencies on Aging (AAA)
 - ▶ 37 clients agreed to participate
 - ▶ 88% participation; 5 declined
- ▶ Centers for Independent Living (CIL)
 - ▶ 12 clients agreed to participate
 - ▶ 100% participation; 0 declined
- ▶ Community Services Boards (CSB)
 - ▶ 323 clients agreed to participate
 - ▶ 73% participation; 121 declined
- ▶ Free and Charitable Clinics (FCC)
 - ▶ 37 clients agreed to participate
 - ▶ 84% participation; 7 declined

Gender

- ▶ Self-Identified Gender:
 - ▶ Female 57%
 - ▶ Male 41%
 - ▶ Non-Binary (n=1)
 - ▶ Other (n=6)
 - ▶ Transgender Female (n=1)
 - ▶ Transgender Male (n=2)
 - ▶ No response to question (n=1)

Age*

Agency Type:	N	Mean	Median
Area Agency on Aging (AAA)	37	76.78	80.00
Center for Independent Living (CIL)	11	52.64	57.00
Community Services Board (CSB)	305	42.05	40.00
Free and Charitable Clinic (FCC)	36	38.42	30.00
Total	389	45.31	43.00

- 20 ages found out of range
 - Only data variable typed in, other than free text boxes
 - May indicate age at which injury occurred
 - Based on follow up to date with agencies in question, age variable deleted and other responses kept

Total Sample

- ▶ Have you ever had a traumatic brain injury?
 - ▶ Yes = 104
 - ▶ No = 304
 - ▶ 25% said yes
 - ▶ AAA 41% (n = 15)
 - ▶ CIL 8% (n = 1)
 - ▶ CSB 23% (n = 75)
 - ▶ FCC 35% (n = 13)

Total Sample

- ▶ What caused your TBI?
 - ▶ Motor vehicle collision = 32%
 - ▶ Falls = 19%
 - ▶ Hit in the head with a heavy object = 16%
 - ▶ Pedestrian hit by vehicle = 5%
 - ▶ Sports or recreational activity = 4%
 - ▶ Bicycle = 3%
 - ▶ Partner violence = 2%
 - ▶ Exposed to blast forces in the military = 1%

Other mechanism of injury (TBI)

- ▶ Other responses 18% (n=19)
 - ▶ Parental abuse
 - ▶ Assault (thrown down stairs)
 - ▶ Item falling on head
 - ▶ Fell out of crib as an infant
 - ▶ Multiple sources (fights, falls, blunt trauma)

TBI Severity

- ▶ Were you knocked out (unconscious) or in a coma?
 - ▶ Yes = 64% (n=67 out of 104)
- ▶ If yes, for how long:
 - ▶ 1 to 30 minutes = 46%
 - ▶ 31 to 60 minutes = 7%
 - ▶ More than 60 minutes = 46%

Total Sample

- ▶ Have you ever had any other kind of brain condition, event, or disorder diagnosed by a doctor such as any of the following:
 - ▶ Seizures = 8% (n = 34)
 - ▶ Stroke = 4% (n = 17)
 - ▶ Dementia = 3% (n = 13)
 - ▶ Loss of oxygen to the brain = 1% (n = 4)
 - ▶ Brain tumor = <1% (n = 3)
 - ▶ Other = <1% (n = 3)
 - ▶ Brain infections = 0
 - ▶ No = 82% (n = 334)

ABI by Agency

- ▶ Stroke
 - ▶ CSB 47%
 - ▶ AAA 29%
 - ▶ CIL 12 %
 - ▶ FCC 12%
- ▶ Seizures
 - ▶ CSB 91%
 - ▶ FCC 9%
- ▶ Dementia
 - ▶ AAA 69%
 - ▶ CSB 31%

Current Thinking Problems (Total Sample)

- ▶ Do you currently have any problems or issues with your thinking from this brain injury/condition/event/disorder?
 - ▶ Yes = 51% (n = 68)
 - ▶ No = 49% (n = 66)
- ▶ Current cognitive problem:
 - ▶ Memory = 93%
 - ▶ Other = 7%
 - ▶ Vertigo, "space out," racing thoughts, headaches
 - ▶ Symptoms not endorsed by any participant:
 - ▶ Attention/concentration, language, problem solving, multi-tasking

Current Physical Problems (Total Sample)

- ▶ Do you currently have any physical problems or issues from this brain injury/condition/event/disorder?
 - ▶ Yes = 38% (n = 51)
 - ▶ No = 62% (n = 82)
- ▶ Current physical problem:
 - ▶ Nausea = 93% (n = 51)
 - ▶ Other = 7% (n = 4)
 - ▶ "Weakness over right eye", speech, neuropathy, worsened eyesight

Current Physical Problems (Total Sample)

- ▶ Symptoms not endorsed by any participant:
 - ▶ Fatigue
 - ▶ Balance/dizziness/walking
 - ▶ Weakness or numbness in hands or feet
 - ▶ Trouble with vision or hearing
 - ▶ Pain, including headache, neck pain, or body pain
 - ▶ Sensitivity to light or sound
 - ▶ Sleep problems (too much or too little)

Current Emotional Problems (Total Sample)

- ▶ Do you currently have any emotional problems or issues that you think are due to your brain injury/condition/event/disorder?
 - ▶ Yes = 40% (n = 53)
 - ▶ No = 60% (n = 80)
 - ▶ CSB responses
 - ▶ Yes = 34%
 - ▶ No = 66%
 - ▶ Current emotional problem:
 - ▶ Depression = 96% (n = 53)
 - ▶ Other = 4% (n = 2)

Current Emotional Problems (Total Sample)

- ▶ Symptoms not endorsed by any participant:
 - ▶ Thoughts of self-harm/suicide, self-injurious behavior, suicide attempts
 - ▶ Anxiety
 - ▶ PTSD
 - ▶ Increased emotionality/"short fuse"
 - ▶ Visual or auditory hallucinations
 - ▶ Difficulty trusting others/suspicious of others' motives
- ▶ "Other" responses:
 - ▶ "Afraid to sexually interact with other women"
 - ▶ "Used to be depressed, but not anymore"

Agency Personnel Survey

- ▶ After completion of VBIST pilot, queried participating agency personnel
 - ▶ Qualtrics system
 - ▶ Separate survey
 - ▶ Confidential responses
- ▶ Purpose was to investigate ease of use (or not) of VBIST

Agency Responses

- ▶ The VBIST is easy to use.
 - ▶ Strongly Agree 36%
 - ▶ Agree 55%
 - ▶ Neutral 9%
 - ▶ Disagree/Strongly Disagree 0
- ▶ The VBIST is quick to administer.
 - ▶ Strongly Agree 27%
 - ▶ Agree 45%
 - ▶ Neutral 27%
 - ▶ Disagree/Strongly Disagree 0

Agency Responses

- ▶ The VBIST will be easy to incorporate into the standard intake evaluation.
 - ▶ Strongly Agree 18%
 - ▶ Agree 45%
 - ▶ Neutral 27%
 - ▶ Disagree 9%
 - ▶ Strongly Disagree 0
- ▶ The VBIST is a good way to gather & organize brain injury intake information.
 - ▶ Strongly Agree 18%
 - ▶ Agree 64%
 - ▶ Neutral 9%
 - ▶ Disagree 9%
 - ▶ Strongly Disagree 0

Agency Responses

- ▶ The VBIST will provide information which will help me consider additional brain injury services for my clients.
 - ▶ Strongly Agree 27%
 - ▶ Agree 36%
 - ▶ Neutral 36%
 - ▶ Disagree/Strongly Disagree 0
- ▶ Additional comments:
 - ▶ "I love this survey!"
 - ▶ "I was glad to participate in this trial, prior to it being instituted."
 - ▶ "Our intake process of clients is lengthy and health coaches sometimes feel overwhelmed with paperwork. Adding this extra component provided some pushback from employees."

Next/Final Steps...

- ▶ Finish checking data for obvious data entry errors
- ▶ Complete data analysis
- ▶ In collaboration with DARS, develop recommendations for agencies who identify clients with current problems attributed to TBI or ABI
- ▶ Finalize training manual for use with VBIST
- ▶ Prepare final project report & individual report for each participating agency

Project Goals – Purpose & Utility

- ▶ To help community health services agencies identify clients with TBI/ABI diagnoses
- ▶ To provide some information regarding whether the TBI/ABI diagnosis might be contributing to current challenges.
- ▶ To provide information on resources for staff to provide to identified clients.
- ▶ Brief, easy to administer
- ▶ Does not require extensive training
- ▶ Provides the following information:
 - ▶ Determination of whether a client self-reports a TBI/ABI diagnosis
 - ▶ Information about the severity of the TBI
 - ▶ Current symptoms related to the TBI/ABI
 - ▶ General diagnostic information to guide referrals

Thank you to participating agencies!

Bay Aging (AAA)
Jefferson Area Board for Aging (AAA)
Senior Connections (AAA)
Resources for Independent Living (CIL)
Middle Peninsula-Northern Neck (CSB)
Southside Community Services (CSB)
Western Tidewater (CSB)
Central Virginia Health Services (FCC)
Health Brigade/Fan Free (FCC)

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