



**Long-term Impact of Mmilitary-relevant Brain
Injury Consortium/Chronic Effects of
Neurotrauma Consortium:
Lessons Learned on Collaborative Research**

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Home of LIMBIC-
CENC (formerly King
Tut's "other tomb")



Bottom Line Up Front: BLUF

- Mature, federal mTBI research consortium since 2013 with robust research infrastructure.
- 10 research studies have been completed with 197 publications and 12 additional grants funded.
- Currently, supporting 6 active research studies
 - 1,600+ (target 3,000) participant Prospective Longitudinal Study
 - Prospective Biomarker Discovery and Novel Neuroimaging studies
 - 2.2+ million-participant Retrospective Database, Phenotypes and Health Economics big data studies using extant federal datasets
- Key deliverable: A range of Knowledge Translation products have been developed and additional ones are underway for consumers, family, clinicians and researchers.
- **How did we build an efficient, productive research program?**

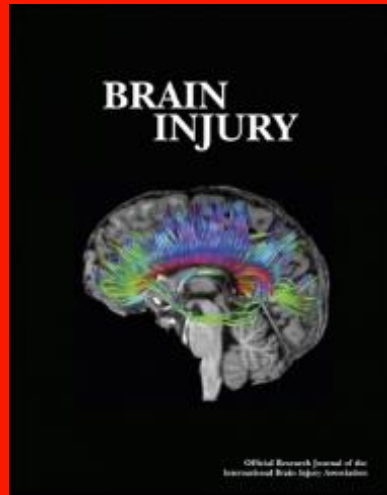
High-Level Overview

LIMBIC-CENC

www.limbic-cenc.org

- The Chronic Effects of Neurotrauma Consortium (CENC 2013–19) identified a range of differences between SM's and Veterans with and w/o mild TBI in the 1,700+ participant Longitudinal Study.
- CENC's unique combined dataset from the electronic medical, benefits, pharmacy and administrative records from VA and DoD of 2+ million unique Veterans revealed linkages between TBI and dementia, Parkinson's disease, chronic pain and suicide.
- The Long-term Impact of Military-relevant Brain Injury Consortium (LIMBIC 2019–24) commenced October 2019, is growing the Longitudinal Study to >3,000 participants, and continue to analyze large electronic dataset.
- LIMBIC-CENC's research teams have identified an association between TBI and dementia, biofluid markers of repetitive TBI and confirmation that pain and mental health disorders worsen dysfunction after mTBI.

Summaries of Protocols and Results



- CENC Special Issue: *Brain Injury* 2016; 30(12): 1397–1514

- ▶ Methodologies for 10 studies
- ▶ Assessment Protocols and Tools

<https://www.tandfonline.com/toc/ibij20/30/12?nav=tocList>

- CENC Special Issue *Brain Injury* 2018; 32(9): 1149–1294

- ▶ Findings for 10 studies through Spring 2018
- ▶ Integration of findings across 7 clinical studies

<https://www.tandfonline.com/toc/ibij20/32/10?nav=tocList>

- LIMBIC Special Issue of *Brain Injury* scheduled for Fall 2021 on

“Practical Approaches to Assessing and Mitigating the Risk of Cognitive Decline after Concussion: *Findings from the Long-term Impact of Military-relevant Brain Injury Consortium (LIMBIC)*”



Research Cores

Coordinating Center

- ★ Virginia Commonwealth University, Richmond, VA

Neuroimaging Core

- ◆ VA Salt Lake City Health Care System/University of Utah, Salt Lake City, UT

Biomarkers Core

- ◆ Uniformed Services University of the Health Sciences/ National Institutes of Health, Bethesda, MD

Data and Biostatistics Core

- ◆ Hunter Holmes McGuire VA, Richmond, VA
- ◆ Virginia Commonwealth University, Richmond, VA
- ◆ VA Salt Lake City Health Care System/ University of Utah, Salt Lake City, UT
- ◆ University of Hawaii, Department of Speech, Honolulu, HI

Prospective Longitudinal Study

Enrollment Sites

- Hunter Holmes McGuire VA, Richmond, VA
- Michael E. DeBakey VA Medical Center, Houston, TX
- James A. Haley Veterans Hospital, Tampa Florida
- South Texas Veterans Hospital, San Antonio, TX
- Fort Belvoir Community Hospital, Alexandria, VA
- VA Portland Health Care System, Portland, OR
- Minneapolis VA Health Care System, Minneapolis, MN
- VA Boston Healthcare System, Boston, MA
- WG Hefner VA Medical Center, Salisbury, NC
- Eisenhower Army Medical Center, Fort Gordon, GA
- VA San Diego Health System/University of California- San Diego/Camp Pendleton, San Diego, CA

Recruiting Sites

- MacDill Air Force Base, FL
- Joint Base Lewis-McChord, WA
- Fort Steward, Columbia, SC
- Naval Amphibious Base, Coronado, CA



Additional Research Studies

Retrospective Database Study

- ▼ San Francisco VA Medical Center/University of California- San Francisco, San Francisco, CA

Phenotypes Study

- ▼ VA Salt Lake City Health Care System/ University of Utah, Salt Lake City, UT

Health Economics Study

- ▼ VA Palo Alto Health Care Systems/Stanford University

Biomarkers Discovery Study

- ▼ USUHS/NIH, Bethesda, MD
- ▼ North Florida/South Georgia Veterans Health System, Gainesville, FL

Novel Neuroimaging Study

- ▼ VA Salt Lake City Health Care System/ University of Utah, Salt Lake City, UT

LIMBIC-CENC Legacy Study Sites

Epidemiology of mTBI and Neurosensory Outcomes

- ▲ San Francisco VA Medical Center, San Francisco, CA

Tau Modification Study

- ▲ Roskamp Institute, Sarasota, FL/Barrows Institute, Phoenix AZ

Otolith Dysfunction

- ▲ Mountain Home VA Medical Center, Mountain Home, TN

Novel White Matter Imaging to Improve Diagnosis of Mild TBI

- ▲ VA San Diego Healthcare System, San Diego, CA

ADAPT/EVOLVE

- ▲ University of Washington, Seattle, WA

Structural and Functional Neurobiology of Veterans Exposed to Primary Blast Forces

- ▲ WG Hefner VA Medical Center, Salisbury, NC

DTI Phantom Study

- ▲ Baylor College of Medicine, Houston, TX

Clinical and Neuroimaging Correlates of Neurodegeneration in Military mTBI

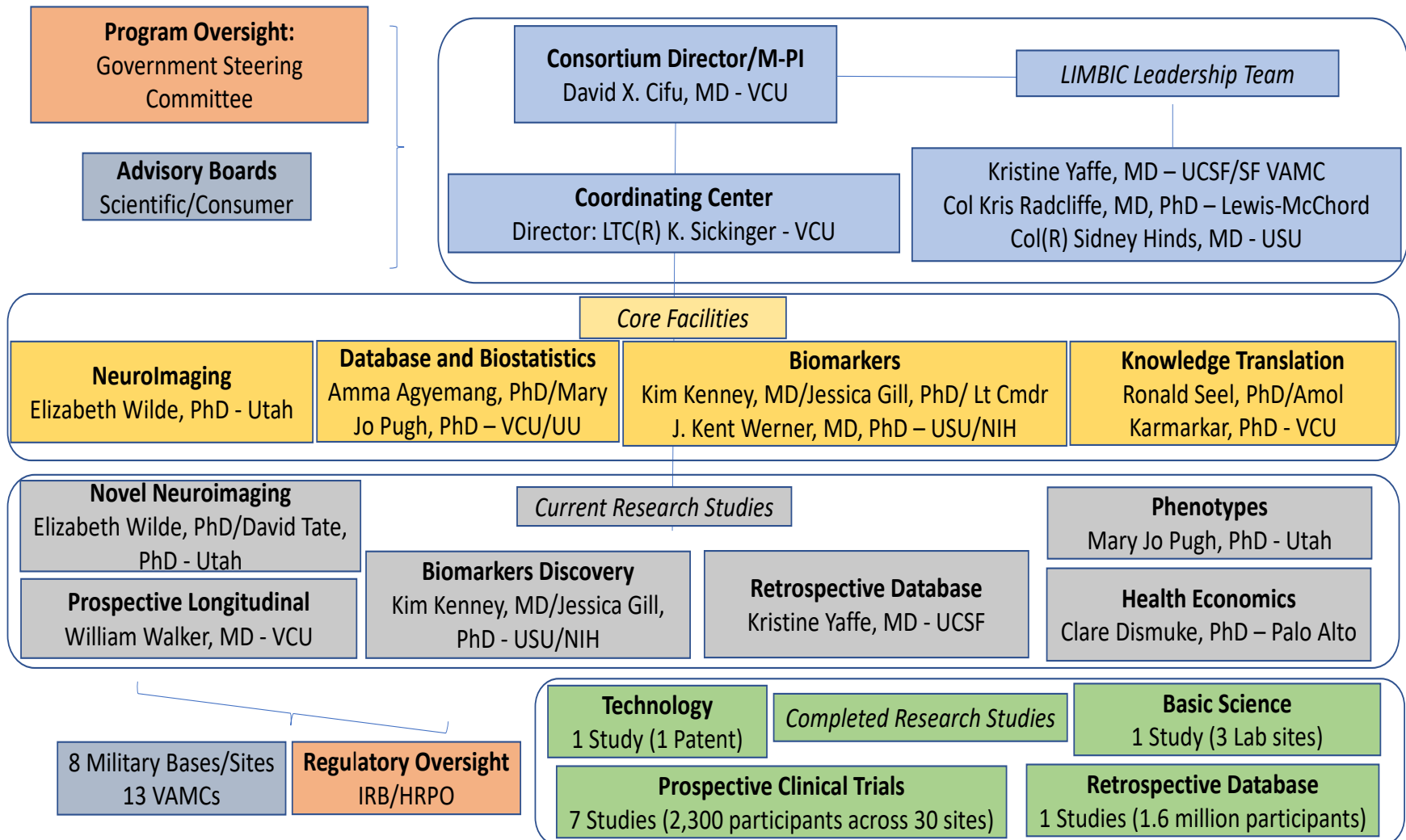
- ▲ Minneapolis VA Health Care System

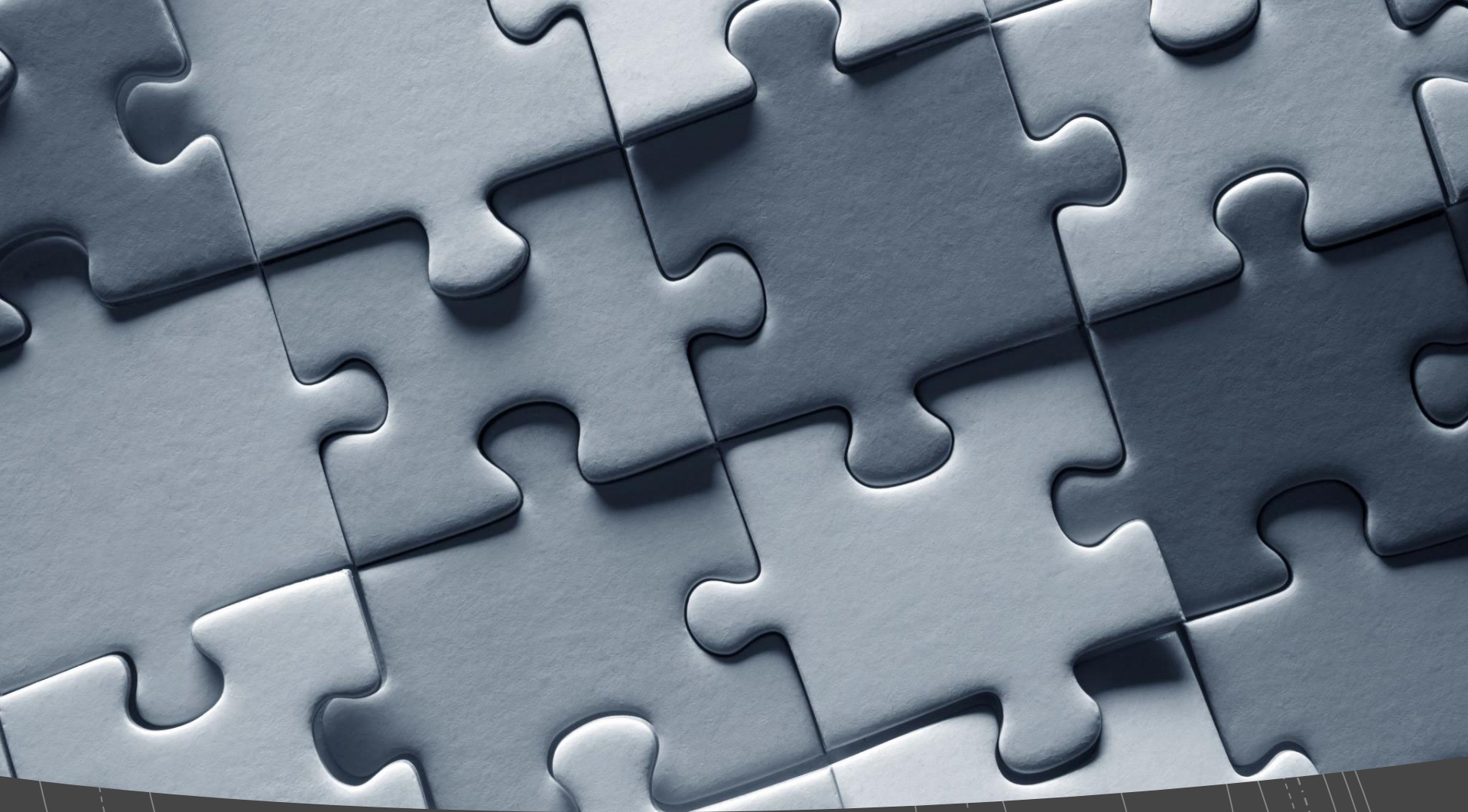
Visual Sensory Impairments

- ▲ Iowa City VA Health Center, Iowa City, IA

Long-Term Impact of Military-relevant Brain Injury Consortium (LIMBIC) 2013-2024

Long-term Impact of Military-relevant Brain Injury Consortium (LIMBIC)





So how did we get here?

Knowledge Translation Center

- Dementia Risk and Risk Reduction Tools
- Patient Education Videos
- Clinical Pearls Postcards
- Gold Standard Research Assessments
- Searchable Scientific Reference Catalog

Building research capacity and output from the research infrastructure

CENC 2013

Develop research and administrative infrastructure.

Initiate one 4-center prospective study.

2014-15

Establish mega-database from 9 extant datasets.

Implement Round 1 of research RFPs.

Implement 3-site Basic Science project.

2015-16

Add 4 additional centers to Prospective Longitudinal Study.

Initiate one single center and one 3-center prospective studies.

Initiate 8-site Technology project.

Sponsor National Meeting.

2016-17

Implement Round 2 of research RFPs.

Publish initial research articles.

Initiate three single center prospective studies.

Present approach and findings at national meetings.

Obtain additional grant funding.

Add Health Economist.

2018-19

Publish Special Editions on Research Methodology and Findings

Publish additional research articles.

Present research findings at national meetings.

Obtain additional grant funding

Enroll 2,000+ participants

Add Knowledge Translation Center.

LIMBIC 2020-21

Secured funding to expand into LIMBIC.

Expand PLS to 17 recruitment and 11-testing sites

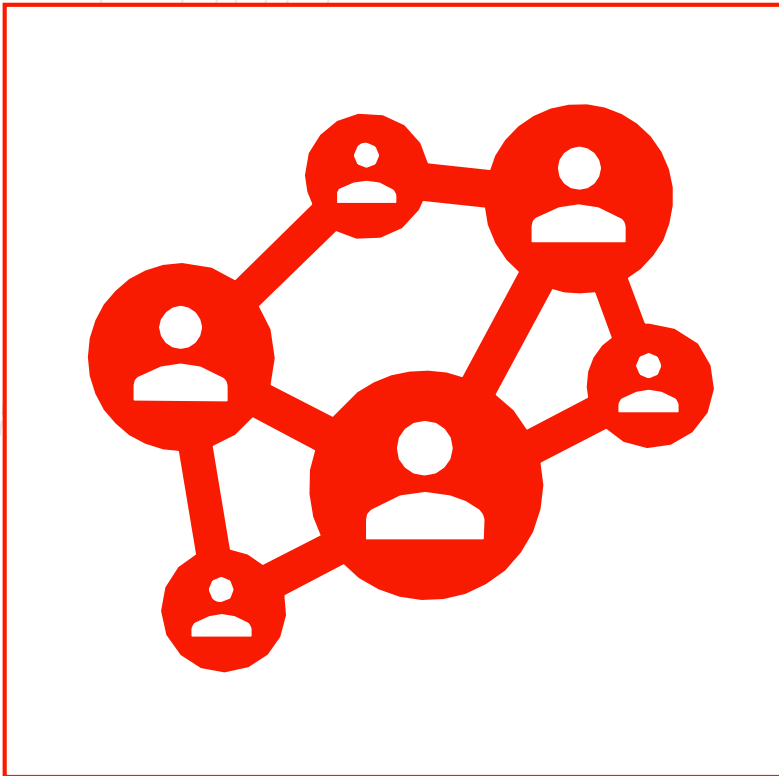
Initiate prospective Biomarker and Neuroimaging Studies.

Expand Database studies to 3 unique areas of focus:

- Epidemiology
- Phenotypes.
- Health Economics

LIMBIC-CENC: Progressively building upon the experience and infrastructure of an established consortium to study long-term effects

Keys to Building a Collaborative Program



- The PI had established research and professional relationships (and a positive reputation) with all the key leaders of the team.
- The initial team of researchers had been connected academically for 5+ years before the RFP.
- The leadership team began having weekly 1-hour calls >12 months before the RFP was released to vet ideas, establish organization matrices and build workable collaborative programs.
- Individuals who didn't attend calls, couldn't compromise, or weren't able to adapt to the collaborative model were not included.

Keys to Building a Collaborative Program

- The initial aspirational goals of the researchers were high; however, expediency dictated that the “goals” of the funding agencies needed to be met.
- Research projects and new expertise were introduced progressively over the initial 5-year cycle
- All funding and organizational decisions were done transparently and in a democratic fashion.
- Excellence and success were praised, while failures were ameliorated and optimized.





Keys to Building a Collaborative Program

- Everyone/No one is a superstar.
- Young/New investigators are given seats at the table, mentored and given increasing responsibility.
- Change and innovation are welcomed at all levels.
- All work is interdisciplinary.
- “Persons-served” are hired, used to guide ideas, vet products, and provide critical insights.
- KISS – Stick to the core missions, ignore shiny objects and keep it real.

LIMBIC-CENC: Getting It Done Together



8 YEARS OF
LEADERSHIP

1.6+
Million



Unique Participants'
Database

10 COMPLETED
STUDIES



200+ PUBLICATIONS



Brain Injury
SPECIAL ISSUE on
Dementia Risk - 2021



6 ACTIVE
STUDIES



17 SITES
1600+ SUBJECTS
(Target = 3,000)

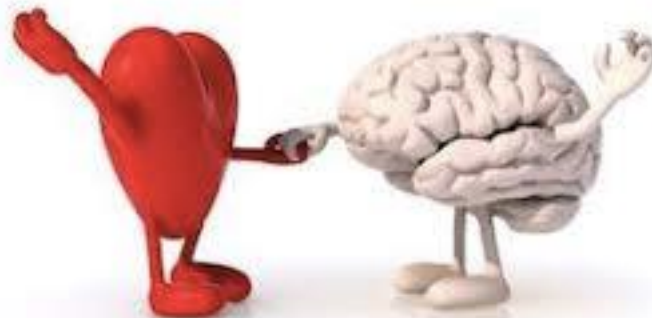
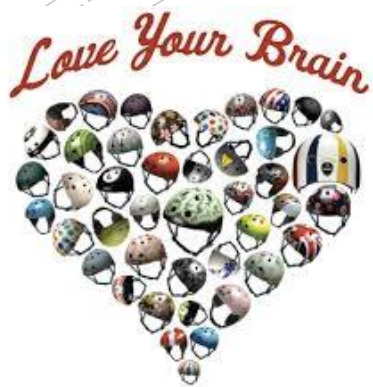


2.2 million
Unique Participants'
Database

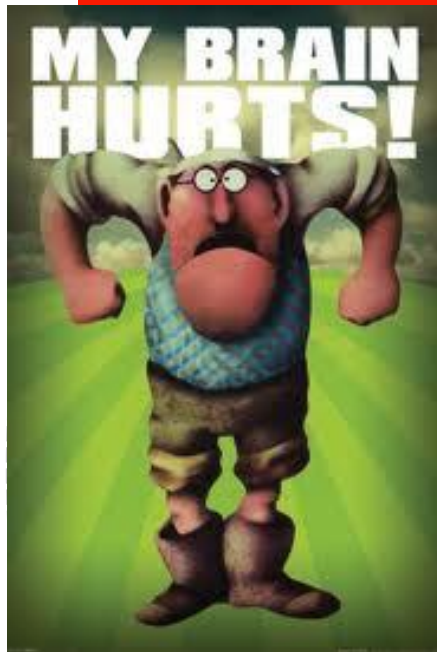


12 ADDITIONAL
GRANTS

LIMBIC 2013 - 2024: 50+ researchers; 19 Universities, 14 VAMCs and 8 DoD facilities



WWW.LIMBIC-CENC.ORG



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