

**TIP OF THE SPEAR:  
The Next Generation of Brain Health Baselineing**

*Amy E Bair, PhD*  
*Catherine P Starnes, PhD*

# PROGRAM EVOLUTION

## Warfighter Brain Health Initiative

*Focus on traumatic brain injury treatment and prevention*

## Preservation of the Force and Family

*Established fifth domain focusing on cognitive performance*

## SABRES

*More robust brain health and performance battery than any other program in Department of Defense*

**S**pecial Operations  
**A**ssessment  
**B**aselining  
**R**eadiness  
**E**valuation  
**S**ystem

## LEVELS OF EVALUATION

- *Holistic Survey*
- *CNS Vital Signs*
- *Quantitative Electroencephalogram (qEEG)*
- *Review & Intervention*

## PURPOSE

- *General Well-Being*
- *Objective Performance*
- *Objective Brain Physiology*
- *Actionable, Personalized Feedback*





# Leveraging Advances in Neurocognitive Science

## Two Lines of Effort

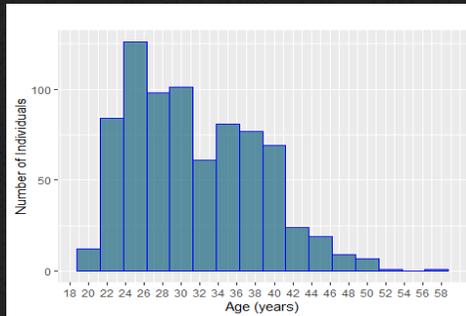
- *Assessment*
- *Performance Enhancement*

## Interpretation

- *Detailed Outcome analyses*
- *Cognitive Performance Training Plans*
- *POTFF Referrals*

# Population Demographics

## Total of 794 SABRES Assessments\*



- **Age** – 20-58, median 30
- **MOS Category** – CSO/SOO (390), Support (362)
- **Rank** – NCOs E4-E5 (277), Staff NCOs E6+ (329)
- **Gender** – 764 Male, 30 Female
- **Years of Service** – 32% 5-8, 17% 9-12, 13% 13-16, 18% 17-20

\*Demographic information is not available for all 794 assessments

## Reason for Assessment:

- 70% Baseline
- 30% Provider Indicated

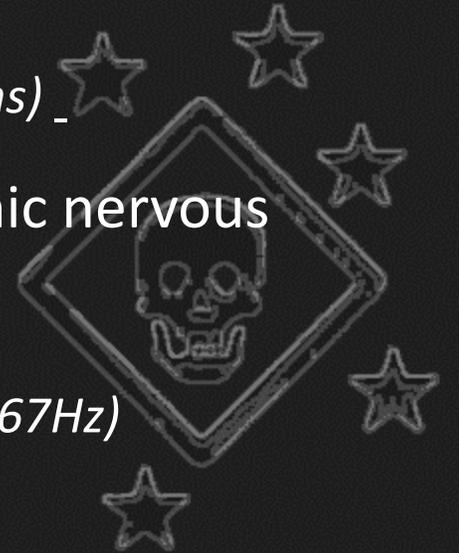
## Top Concerns/Areas for Improvement (non-exclusive):

- Sleep 55%
- Stress 47%
- Auditory Processing/Memory 32%
- Attention 30%
- Residual Concussive Effect 21%
- Overactive Brain 18%



# Cognitive Phenotype of SOF Population

- Impact of Chronic Fatigue/Sleep Impairment – *slow Reaction time and Executive Function/Cognitive Flexibility percentiles (28<sup>th</sup>, 42<sup>nd</sup>, 45<sup>th</sup> percentiles, respectively)*
- Sacrifice speed for high accuracy – *Reaction time and High Variability data*
- Broad Situational awareness – *Theta/beta brainwave ratios ( $2.2 \pm .53$ )*
- Potential indicators of TBI/Concussion – *ERP300b latency ( $517.5 \pm 65.4$  ms)*
- Slight sympathetic and parasympathetic predominance of autonomic nervous system regulation – *Bimodal HRV frequency spectrums*
- Brain Function Index within range – *Mean peak alpha frequency ( $10.0 \pm 0.67$ Hz)*



# Performance Enhancement Interventions

- **Neurofeedback**— *Identify brainwave activity outside of normative range and use operant conditioning with auditory/visual reinforcer*
- **Biofeedback** – *HRV Training to optimize mind-body connection*
- **Cognitive Training Plans** – *Learn skill, develop/test skill under stress, implement skill in job related tasks*
- **Sleep hygiene and Fatigue management** – *Education, resources, tracking/referrals*
- **Performance coaching** — *Observation and training support by embedded Cognitive Performance Specialists*





# Operational Effectiveness of SOF Personnel

*The first SOF truth  
is "humans are more  
important than hardware."*

Comprehensive, actionable data on brain function and performance

*\*Take action to address negative findings or deficits*

*\*Optimize desired capabilities*

Low Performers are identified before more serious impairments or impact to mission readiness

SABRES emphasis on well-being and performance is changing culture to seek care sooner