



SAMUELI INSTITUTE
EXPLORING THE SCIENCE OF HEALING

Defining Total Force Fitness for the 21st Century

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Armed Forces Public Health Conference



Report Documentation Page

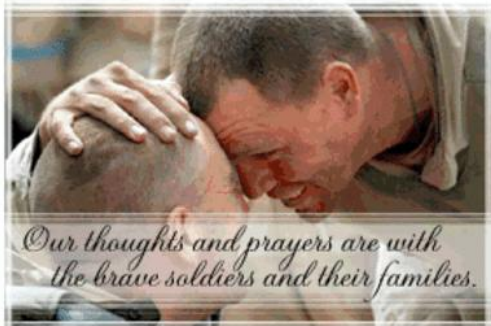
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In partnership with...





Overarching Challenges to Total Fitness

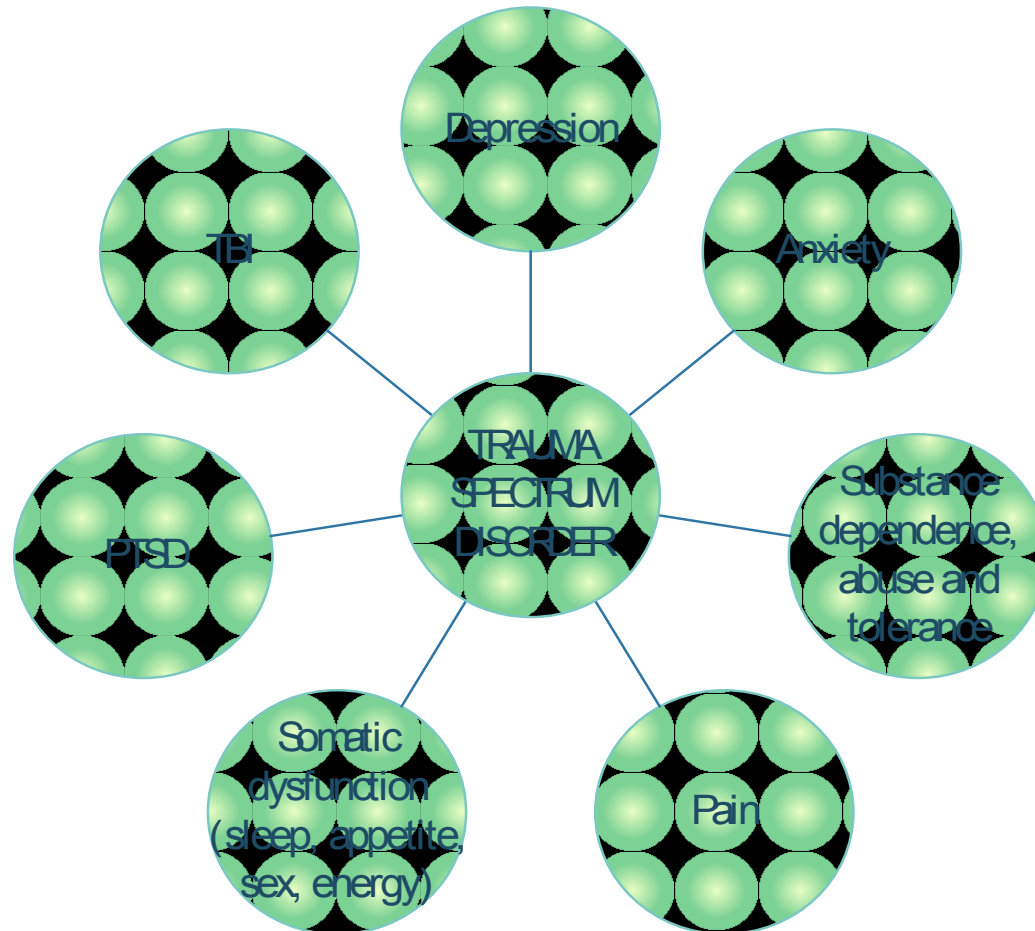
- Physical
 - PT training & Testing
 - Prevent injuries/fatigue
 - Improve treatment & rehabilitation
 - Nutrition and supplement needs
 - Multiple injuries
- Cognitive
 - Information overload
 - Low-fidelity training
- Psychological/Emotional
 - High stress, uncertainty and psychological trauma
 - Diverse backgrounds, experience, and maturity
 - Sleep deprivation/fatigue
- Translation and Communication
 - Lack of validation in the field
 - Multi-service, multi-discipline, competition
 - Coordination/communication of mission relevant information is not adequate for human performance

Capability Gaps

(COL O'Connor/RDML Miller)

- Alertness and sleep/rest management
- Stress/mental management – schedule pressure
- Endurance and Rapid recovery - short and long-term
 - Fatigue and sustainment – “add in the heat, cold, altitude”
 - Knee, leg, ankle and spine – premature OA, “broken”
- Fitness – “quick ramp-up”
 - Not sustained during deployment
 - Not mission specific to prevent injury
- Psychological trauma – 12% to 40% - the “tough” are not immune
- Rapid learning requirements and mental hardiness
- Drug and supplement side effects and interactions
- Pain, pain and pain – conscious and physiological
- Drugs and more drugs – looking for alternatives

Trauma Spectrum Dysfunctions





Steve Herbert

**HUMANS ARE MORE
IMPORTANT
THAN HARDWARE**

Total Force Fitness: The New Paradigm

MIND

BODY

Spiritual
Psychological
Behavioral
Social

Physical
Nutritional
Medical
Environmental



Systems Theory

- **Systems (persons) cannot be understood by studying fundamental constituents, the properties of the parts are *not intrinsic* but can be understood within the context of the whole**
- **Nature of life > interconnection, interdependent, multileveled**
- **Living systems are dynamic and highly nonlinear**
- **Patterns of self-organization are the key**
- **Patterns of organized complexity have *emergent* properties at various levels of organization**

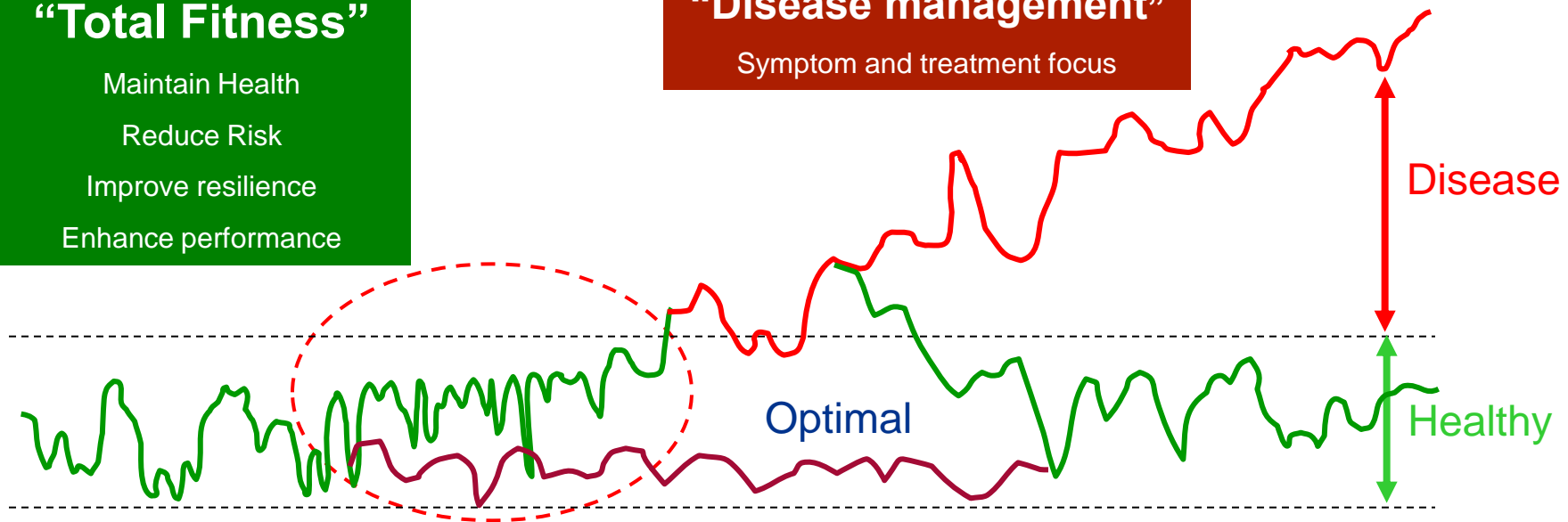
The key to Total Fitness is to provide warriors, families and commanders with knowledge, skills and tools from which health, resilience and optimal performance can emerge.

Health ↔ Reversible → Irreversible

“Total Fitness”

- Maintain Health
- Reduce Risk
- Improve resilience
- Enhance performance

“Disease management”
Symptom and treatment focus



**Changes in behaviors
to maintain performance**

Stress Injury Aging

Total Force Fitness for the 21st Century

- Workshop held on December 6-9, 2009 at the Uniformed Services University of the Health Sciences (USUHS) at the request of the Chairman of the Joint Chiefs of Staff, ADM Michael Mullen
- A group of over 70 scientists, health, social, community and spiritual leaders and those from the front lines was convened to help frame, define and tell us how to evaluate and measure what we need to keep our service members resilient and flourishing in the current environment.
- Working groups helped to define each of the domains identified to make up Total Force Fitness and come up with some metrics to measure each of the domains.



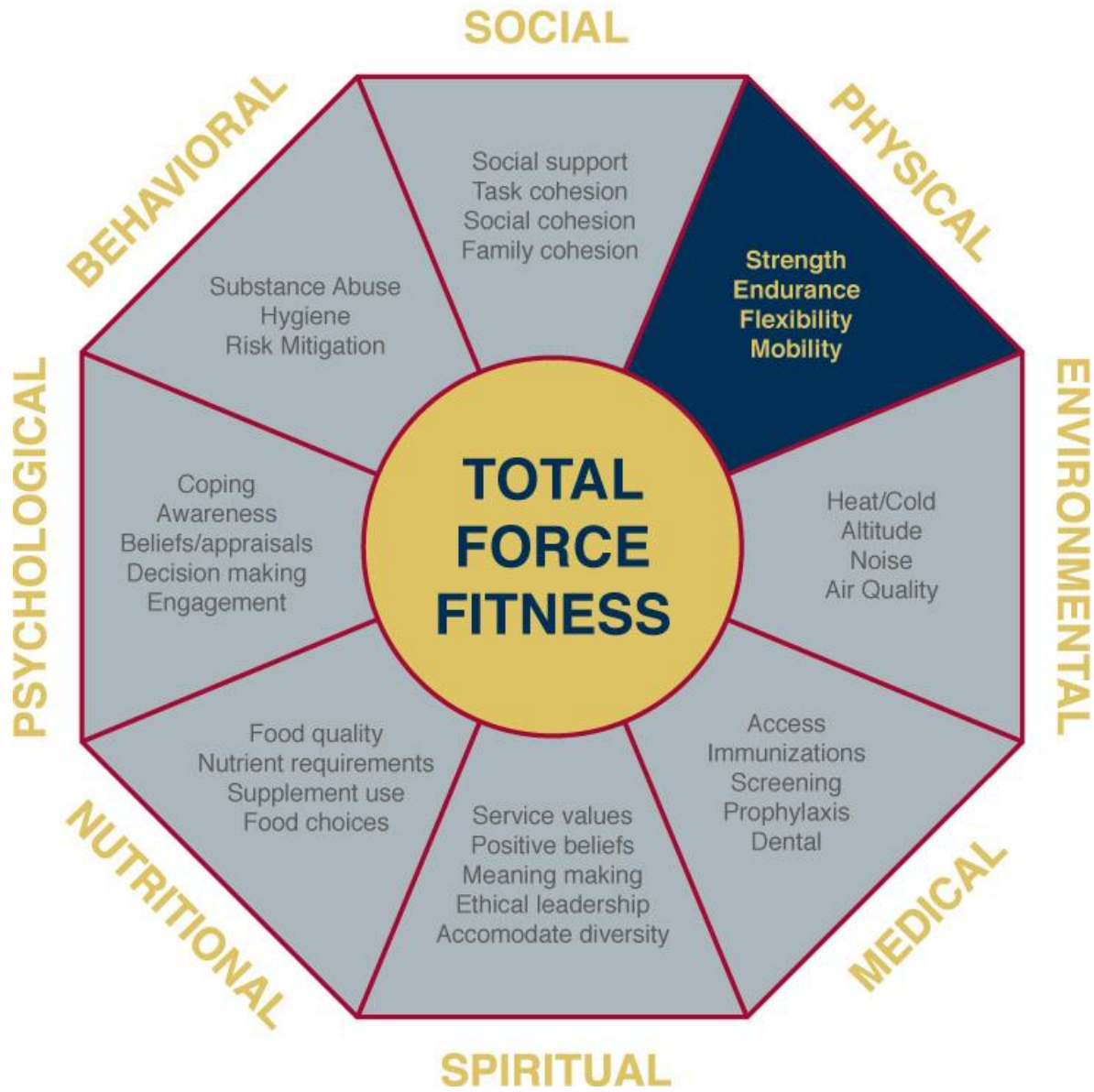
Total Force Fitness for the 21st Century A New Paradigm



August 2010
Supplement to Military Medicine, Volume 175, No 8

Guest Editors
Wayne Jonas | Patty Deuster | Francis O'Connor | Christian Macedonia





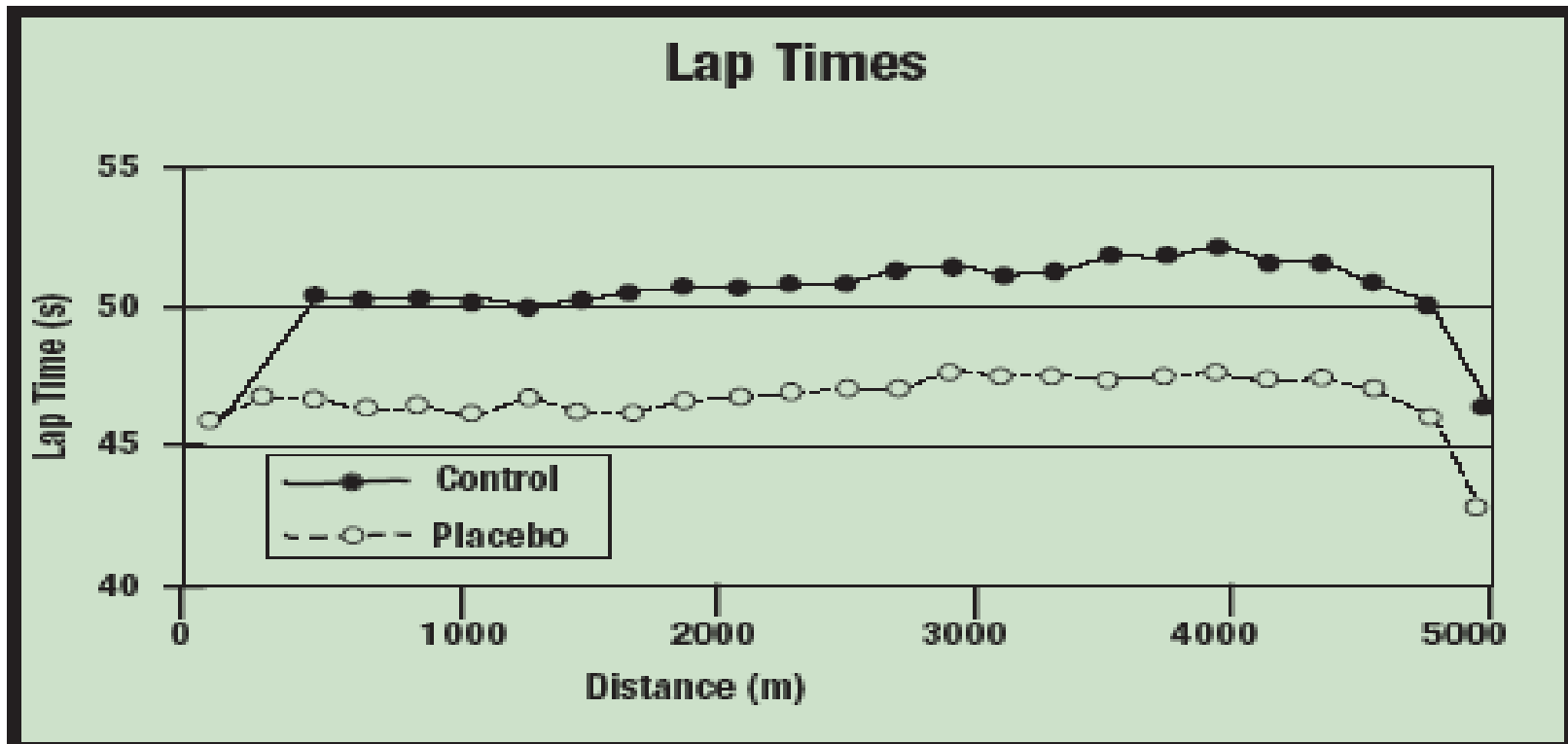
Physical Fitness

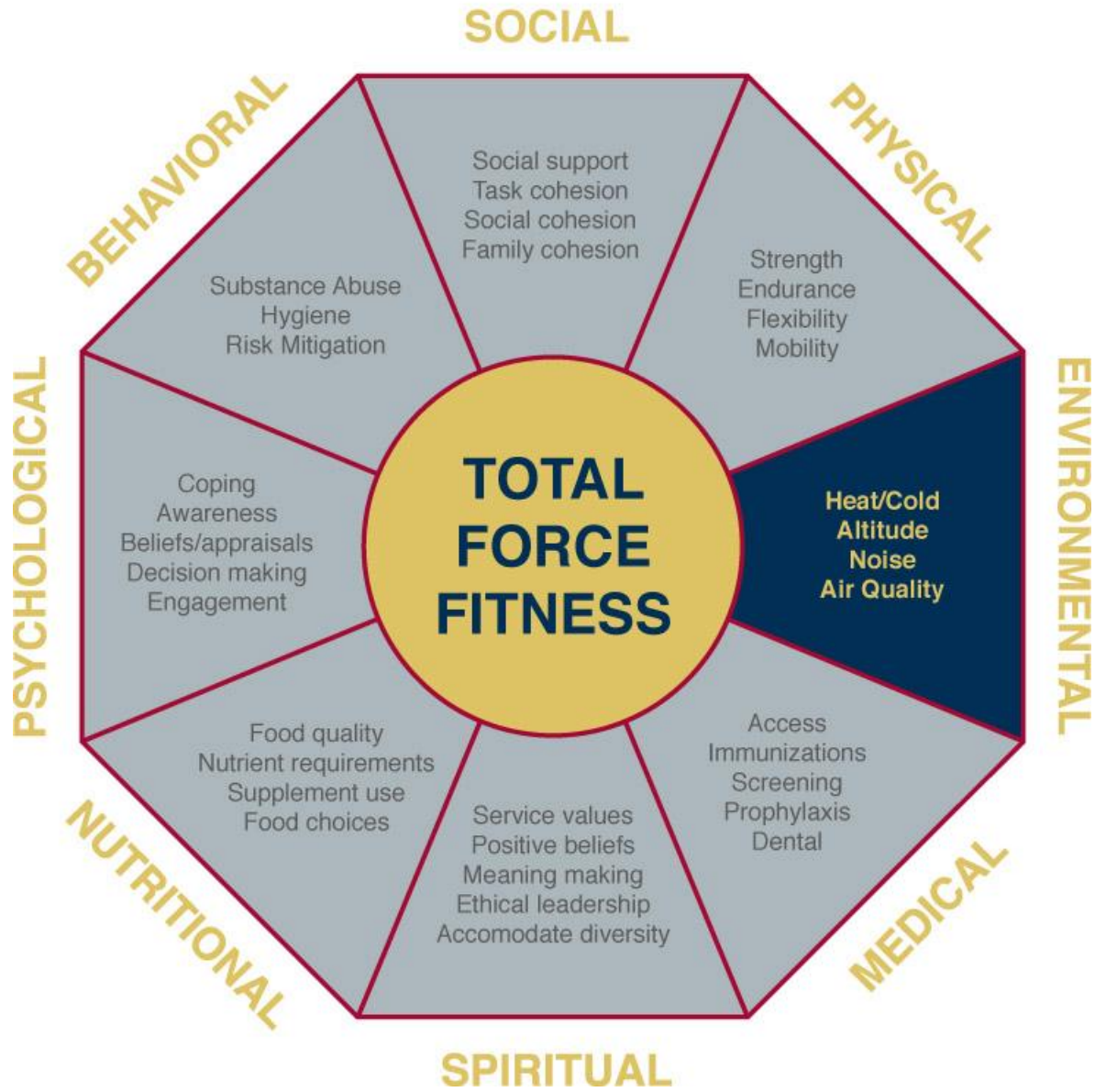
- Physical Fitness is the ability to physically accomplish all aspects of the mission while remaining healthy/uninjured. Physical fitness can be split into four components: endurance, mobility, strength and flexibility
- Metrics: physical fitness test comprised of some variation of a distance run, push ups/pull ups/flexed arm hang, and sit ups, Marine Corp fitness test (these are all individual tests to measure each component individually)

Physical Fitness: A possible set of tests to measure all four physical fitness components

Metric	Measured Component
Push Ups	Endurance
Sit Ups	Endurance
2-Mile Run	Endurance
Illinois Agility Test	Mobility
Medicine Ball Put	Strength
Broad Jump	Mobility
Repetitive Squats	Endurance
Pull Ups /Flexed Arm Hang	Endurance
Functional Movement Screen	Flexibility

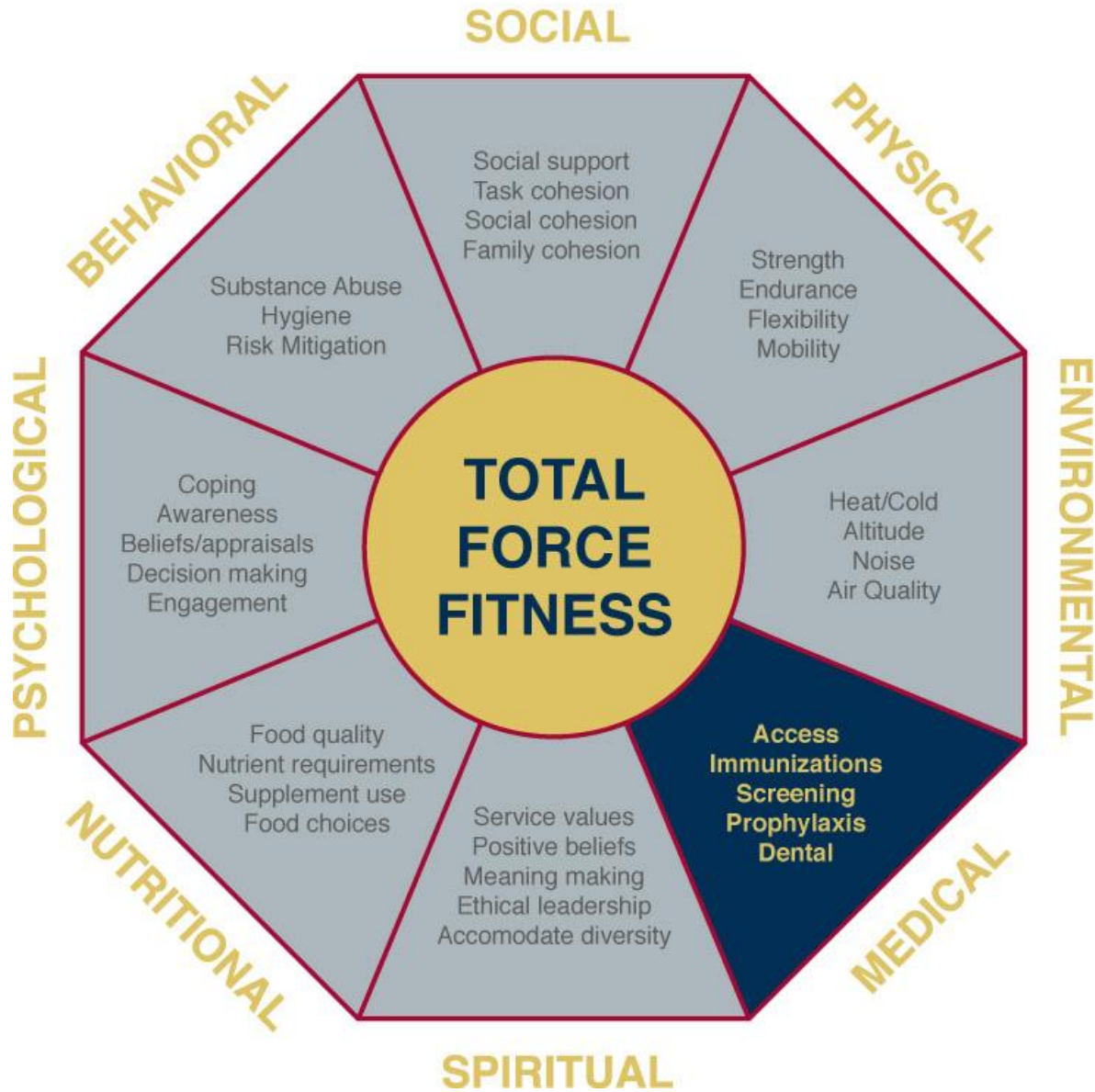
Average Lap Time for Each 200 m of the 5 km Runs for Each Trial





Environmental Fitness

- Environmental Fitness is the ability to perform mission-specific duties in any environment, and withstand the multiple stressors of deployment and war.
- Metrics are currently incompletely defined for most environments, with the exception of risk factors or previous personal or family history of environmental injury (heat stroke). Commanders rely on bulletins and guides to mitigate physical, biological and chemical environmental hazards and maximize operational effectiveness in varied environments

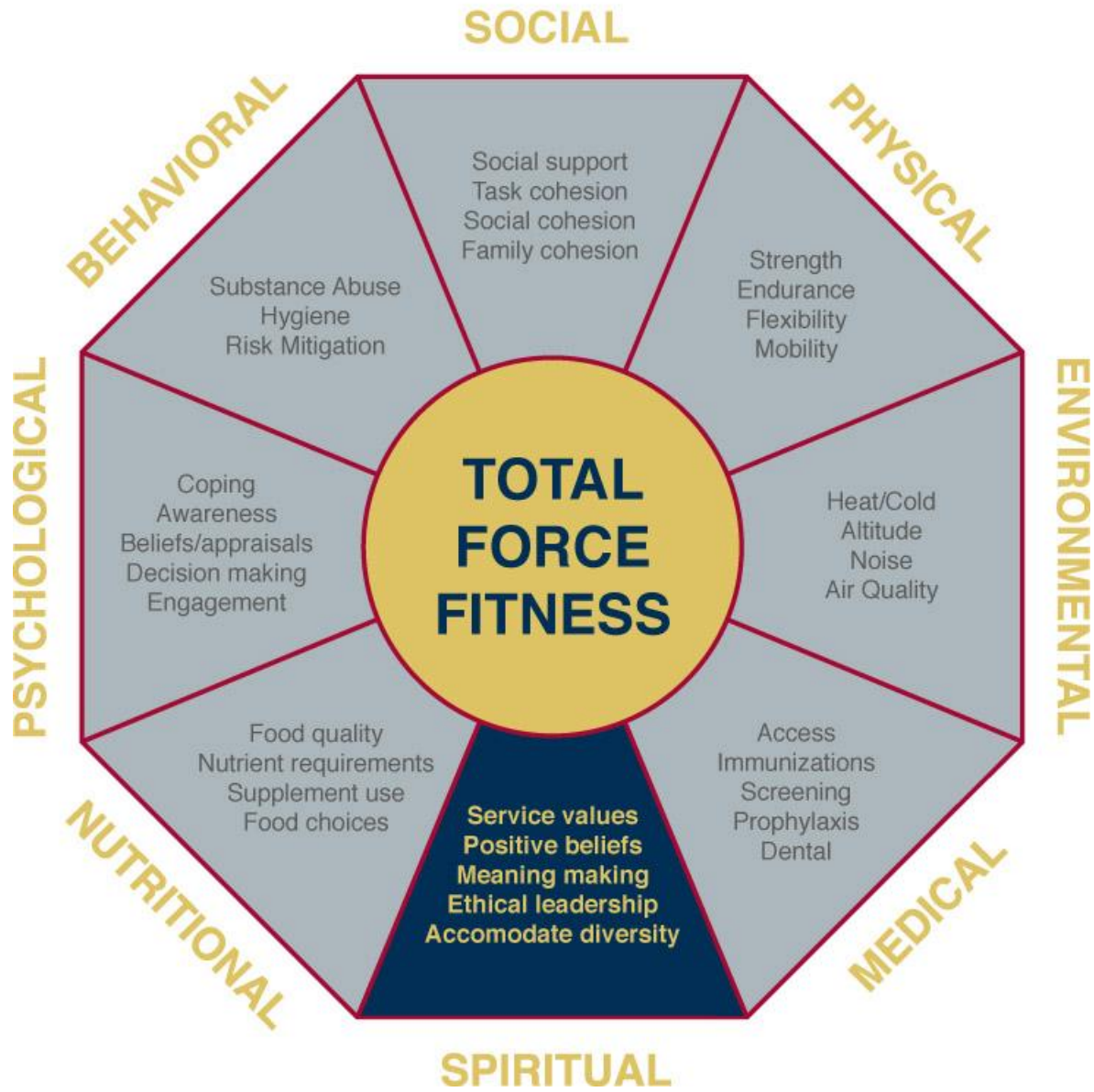


Medical Fitness

- Medical Fitness is a condition of mental and physical well-being as determined by medical metrics that establish prerequisites for individual mission accomplishment and worldwide deployability
- Metrics: DNA sample in storage, dental readiness, HIV-free, immunization profile, limited duty profile, periodic health assessment, vision readiness, hearing readiness, pregnancy

Commander's Medical and Environmental Checklist

- Periodic Health Assessment to include DNA
- Disease Surveillance to include HIV/TB
- Routine Immunizations
- Chemoprophylaxis
- Dental Readiness
- Vision Readiness
- Hearing Readiness
- Baseline Neurocognitive Assessment
- Training (Medical Threat, Field Sanitation)
- Risk Factor Assessment (Disease and Injury)
- Family History
- Nutrition
- Behavioral
- Prior Environmental Injury (Heat, Cold)
- Mission Targeted Human Performance Optimization Assessment
- Supplements/Nutraceuticals
- Drugs
- Techniques (Acclimatization)
- Machines
- Equipment/Supplies (Personal Protective Equipment)



Definitions

Spiritual fitness-

- *“fitness of the spirit or soul, especially from a religious aspect.”*
- depends on diverse beliefs about the soul, theological debates, etc.
- very different definitions of spiritual fitness, within particular spiritual traditions
 - being saved (evangelical Christian)
 - being in a state of grace (Catholic)
 - being able to stay “in the moment” and maintain a self-transcendent view during stressful situations (Buddhism).
- *To assert that some meaning of these concepts is correct, would endorse some spiritual viewpoints while dismissing others. This would be inappropriate to scientific inquiry as well as to the U.S. military.*

For practical purposes, we have focused on **“spiritual-ethical fitness”**

- Refers to the larger realm where spirituality intersects ethics and the other total force fitness domains
- acknowledges that the psychology/spirituality distinction will be drawn very differently by different people
- allows development of coherent policies without favoring one spiritual tradition over another

Metrics for Spiritual Fitness

- Practical and empirically-validated metrics are available for measuring and monitoring service member's levels of spiritual readiness and resilience pre-deployment and while in theater, and assessing risk factors for potential moral trauma and spiritual injury immediately post-deployment.
- Caveat: Most measures for particular components of spirituality have not been validated within the military, and they tend to be designed for research purposes, not practical application in time-pressured settings.
- The evidence accumulated through research measures, however, does provide a solid basis for the development of programs and policies intended to enhance spirituality and fitness.
- The research metrics then can be used in evaluation research to assess the effectiveness of evidence-based programs and policies.
- They may also be useful in working with service members identified as having mission-relevant spiritual problems.

Example metric



USACHPPM-Duke Spiritual Attitude Inventory

Participant ID:

- Commanders can assess, through anonymous and voluntary surveys, service members' and their units' overall levels of spiritual well-being and health before, during, and after deployment using the Spiritual Attitudes Inventory (SAI).
- The 28-item SAI was developed by combining four currently validated measures of religion and spirituality to address the following areas:
 - (1) religious spiritual practice- the Duke Religion Index (DUREL)
 - (2) religious/spiritual belief - the Negative Religious Coping (NRCOPE) scale
 - (3) sense of purpose/connection - the Existential Well-Being Scale (EWBS) (a subscale of the Spiritual Well Being Scale (SWBS))
 - (4) sense of hope/control -the internal/external subscale of the Multiple Health Locus of Control Scale (MHLC)



Nutritional Fitness

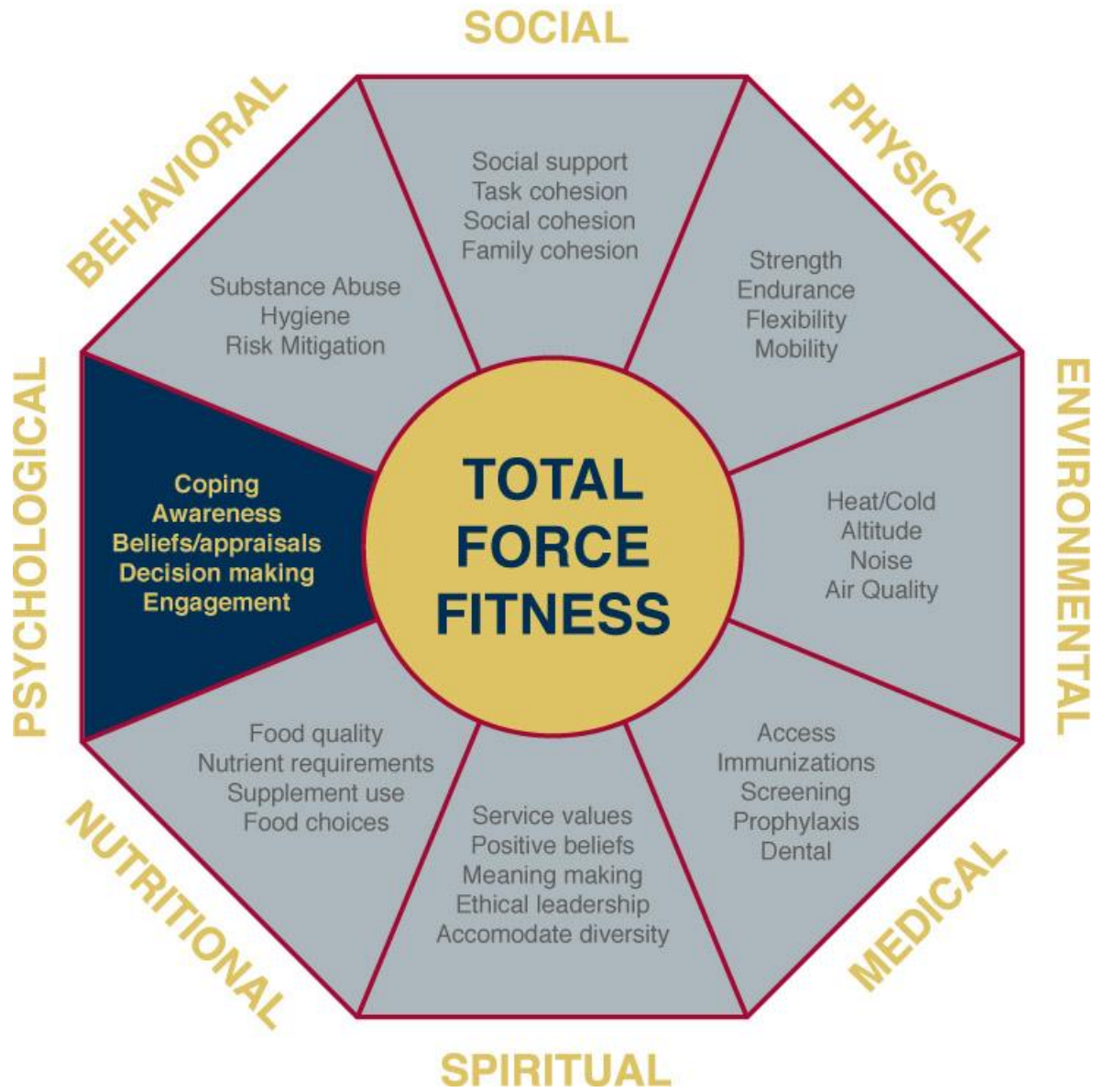
- Nutritional Fitness refers to the provision and consumption of foodstuffs in quantities, quality, and proportions sufficient to preserve mission performance and to protect against disease and/or injury.
- Metrics: The Choose Healthy Options for Wellness (CHOW) and the Develop Improved Nutrition Environment (DINE)

Nutritional Fitness

- Example: To assess whether the food prepared in the dining facilities is sufficient to meet the population's predetermined needs, commanders can check with the installation's food program management office—or similar organization or personnel—to determine whether food preparation complies with menu standards and recipe cards.

Strategies to Improve Nutritional Fitness

- The military has on-going efforts to improve the food supplied to forward-deployed warfighters. A good example is the First Strike Ration. This small, lightweight ration pack includes a full-day supply of food using ready-to-eat food components nutritionally formulated to sustain the warrior during work in austere environments
- The introduction of the Unitized Group Ration–Express, a nutritionally complete meal-in-a-box group ration capable of self-heating and providing a well-balanced meal for 18 warriors.
- Further investigate the intersection between nutrition and psychology [growing body of research on OM3 and depression/suicidality]



Psychological Fitness

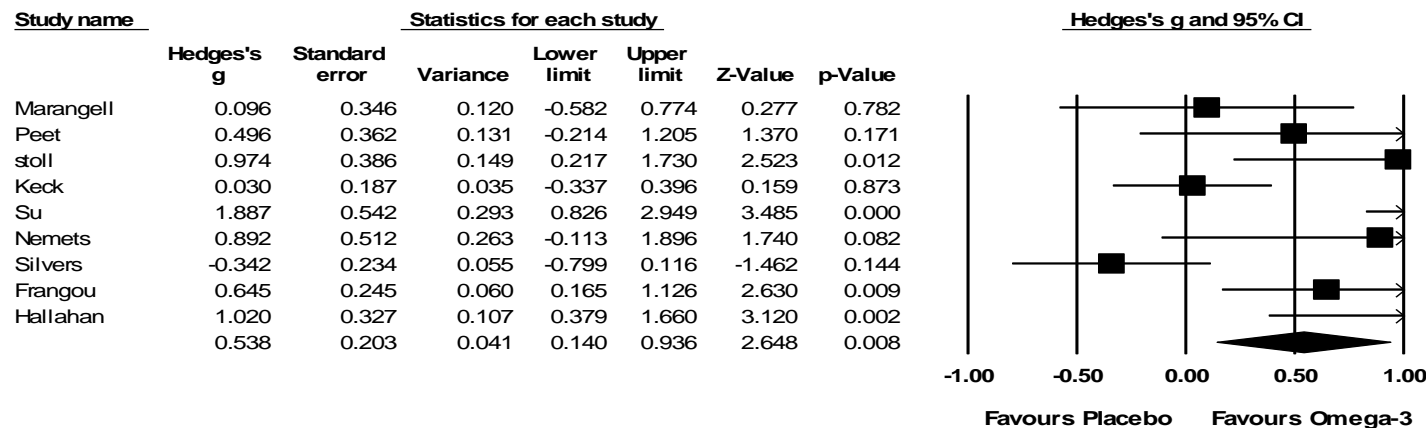
- Psychological fitness is the integration and optimization of mental, emotional and behavioral abilities and capacities to optimize performance and strengthen the resilience of warfighters.
- Possible Metrics: Performance scenarios, inspections and surveys; Performance appraisals and test scores; World Health Organization's Health and Work Performance Questionnaire (HPQ); 360 Survey; Organizational Citizenship Behaviors Questionnaire
- Global Assessment Test (GAT) of comprehensive soldier fitness

Meta-analysis of omega-3's on depressive symptoms, randomized placebo controlled trials

effect size = 0.54, $p < 0.008$



Omega-3 EFA in Affective Disorders

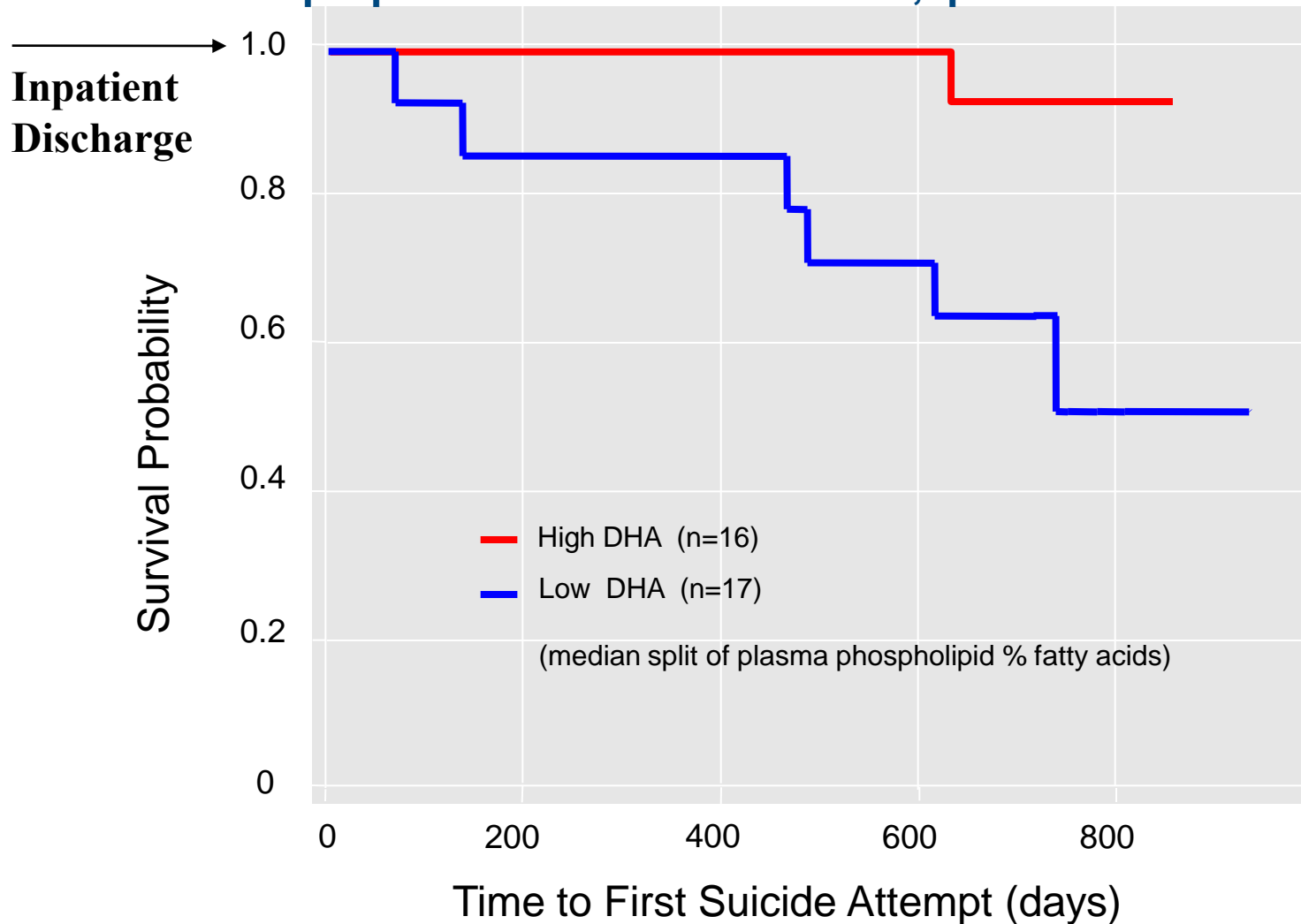


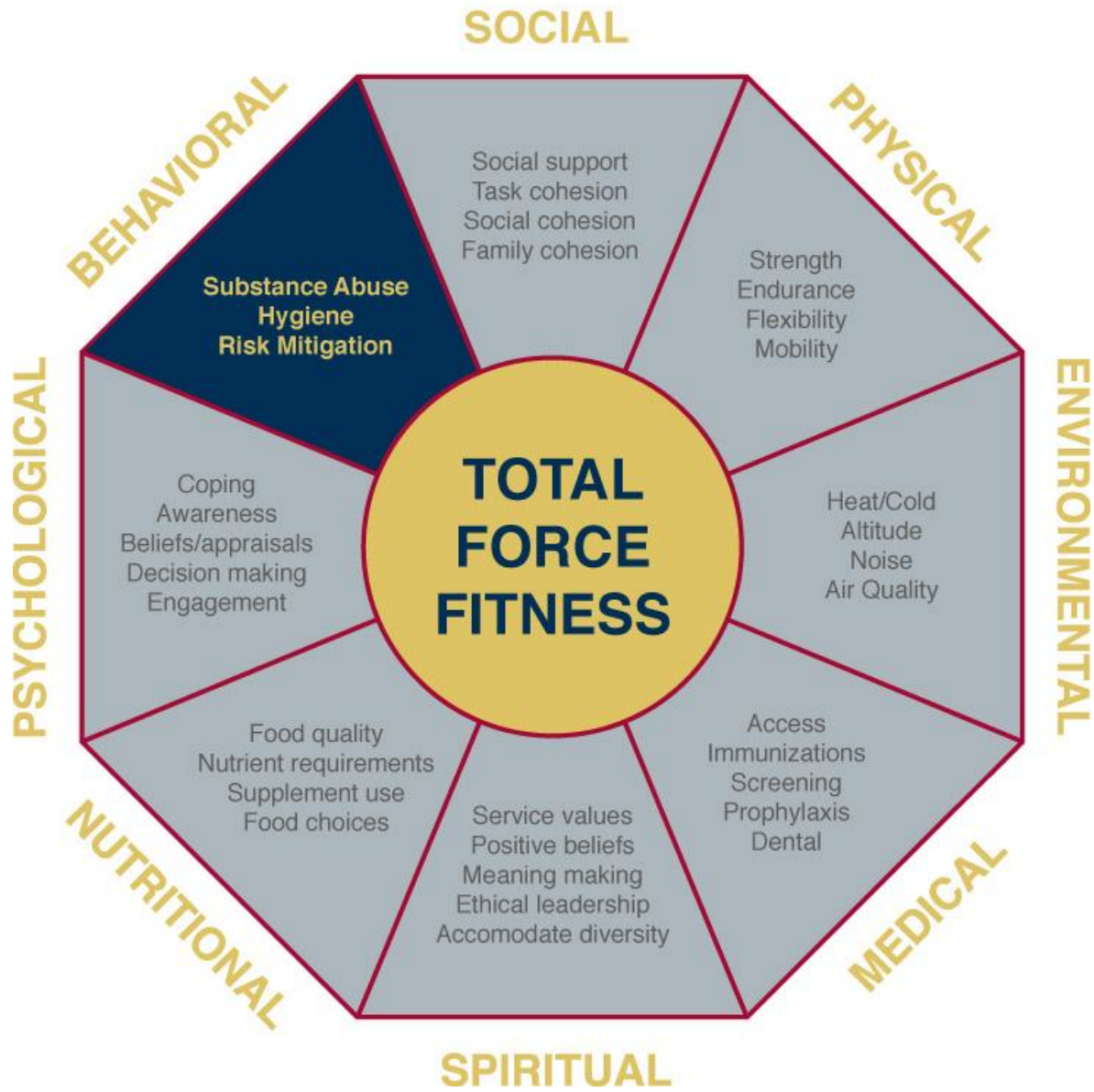
Effect Size g, SE, Variance 95% CI Z and P (Best Case)

Freeman M, Hibbeln JR, Davis JM et al.
American Psychiatric Associations treatment recommendations for
omega-3 fatty acids in psychiatric disorders. J Clin Psychiatry 2006; 67 12: 1954-1967 .

Low Plasma DHA at Baseline Predicts Greater Risk of Future Suicide Attempts

Cox proportional hazard ratio=0.29, $p<0.002$





Behavioral and Occupational Fitness

- Behavioral health refers to the relationship between one's behaviors and their positive or negative health outcomes
- Occupational health refers to the relationship between one's occupational exposures to physical, chemical and biological stressors and related health outcomes as well as occupational performance levels
- Measures for alcohol problems: Alcohol Use Disorders Identification Test (AUDIT) and the CAGE
- Service branches stress prevention through training and education classes. Health messages are communicated to service members on weekends and especially around holidays that warn them not to drink and drive. The Navy's "Right Spirit" campaign calls for removing alcohol from traditional ceremonies.

Occupational Fitness: Stressors

- Periodic surveys, suggestion boxes, and sending feedback up the chain of command are all currently employed on a widespread basis. Post-deployment questionnaires (Post-Deployment Health Assessment Process/Post-Deployment Health Reassessment Program) are also regularly given to determine overall stress and health after returning from combat deployment.
- Commands are increasingly using work environment feedback to assess and improve the work environment and to train leadership in improved command interactions.

Behavioral Health

•Alcohol:

Closer monitoring and regulations of heavy abuse outside of the workplace through anonymous AUDIT and aggregate reporting to the command.

Tobacco:

Closer monitoring and discouraging tobacco use inside/outside the workplace

•Illicit drugs:

Continued regular random drug screening. Improved monitoring of pain, sleep, anxiety, and stimulant medication by physicians through random checks of drug blood levels. Put testing labs in theater and expand the number of metabolites tested.

Weight:

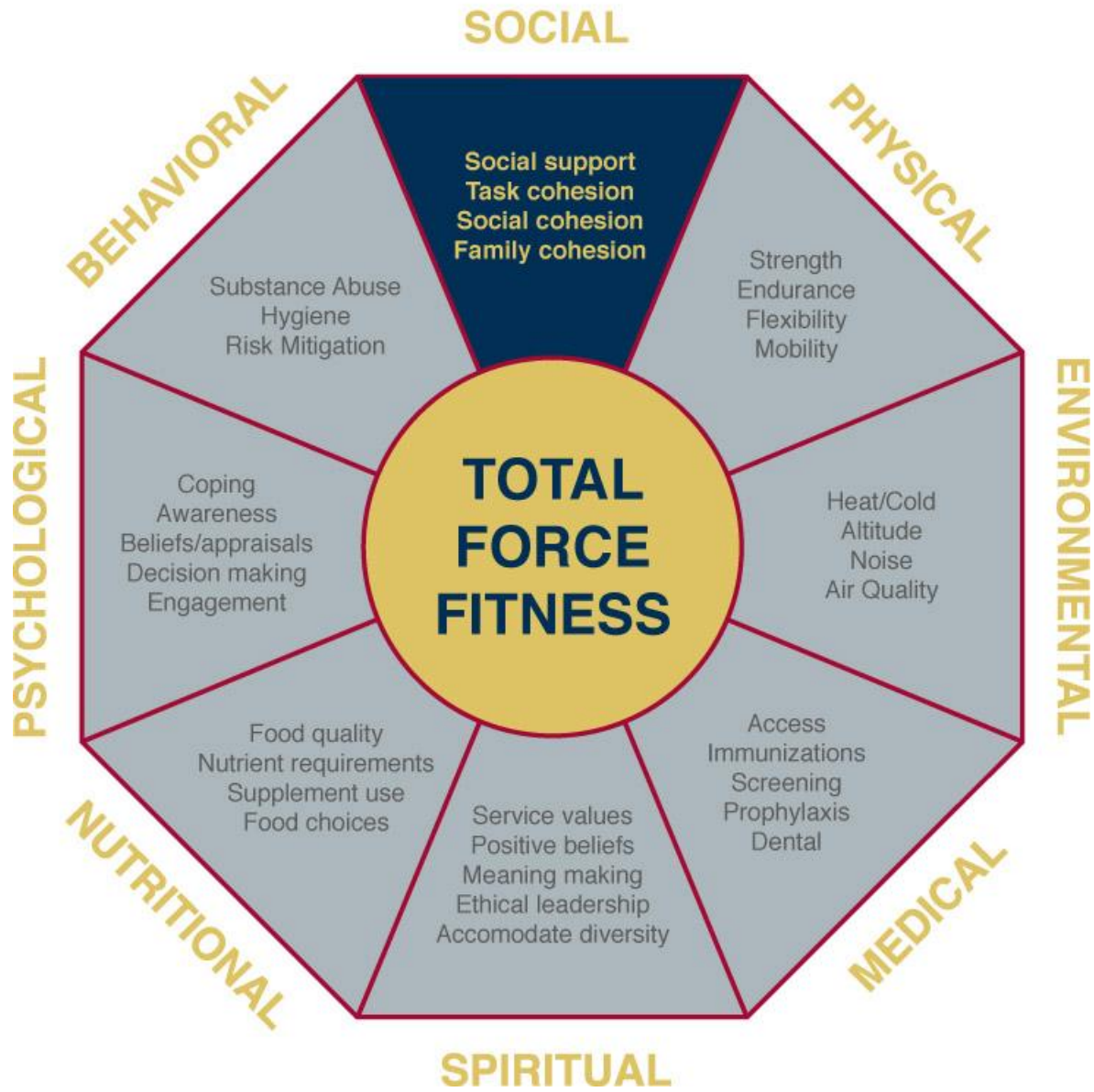
Continued regular fitness assessments; continued regular weight and fitness support programs for those who do not meet standards.

•Sleep:

Institute an informational program of insomnia awareness and prevention, explaining the importance of sleep on health, quality of life, and job performance, as well as the roles played by caffeine and alcohol, irregular schedules, and other factors that influence sleep. Institute behaviorally based insomnia programs for those experiencing primary and secondary insomnia.

Occupational Health

- Psychosocial factors:
Increase emphasis on work and family functioning through similar mechanisms used for prevention and treatment of physical health issues.
- Environmental factors:
Continue health checks before deployment, post-deployment, and on change of duty station. Boost messages of health and safety for driving, hand washing, ear and eye protection, sexual hygiene, and other illness and injury protection through annual updates, unit lectures, and public health announcements.
- Social modeling approach to enforce the desired behaviors such as wearing personal protective equipment.



Social Fitness

- An extensive review of the literature establishes that the most common operationalization of the concept of “social fitness” is the concept of social cohesion. Social cohesion is, in the language of military sociology, a “strength multiplier”: the military strengthening and psychologically protective effect of stable, socially cohesive units is not scientifically speculative, ambiguous, or uncertain.
- Metrics: A simple perceived cohesion scale (PCS), an instrument that consisted of items about group integration (GI), Collective Efficacy Questionnaire (CEQ) and the Group Environment Questionnaire (GEQ)

The personal connectivity of a team is highly correlated with its performance.

High Performance Teams vs. Low Performance Teams

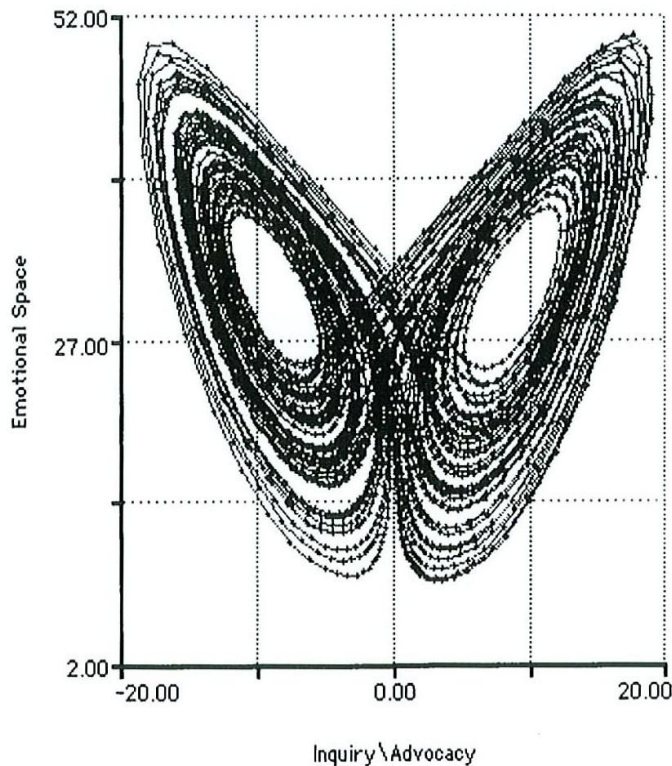


Figure 1. Phase space for high performance teams: inquire-advocacy vs. emotional space.

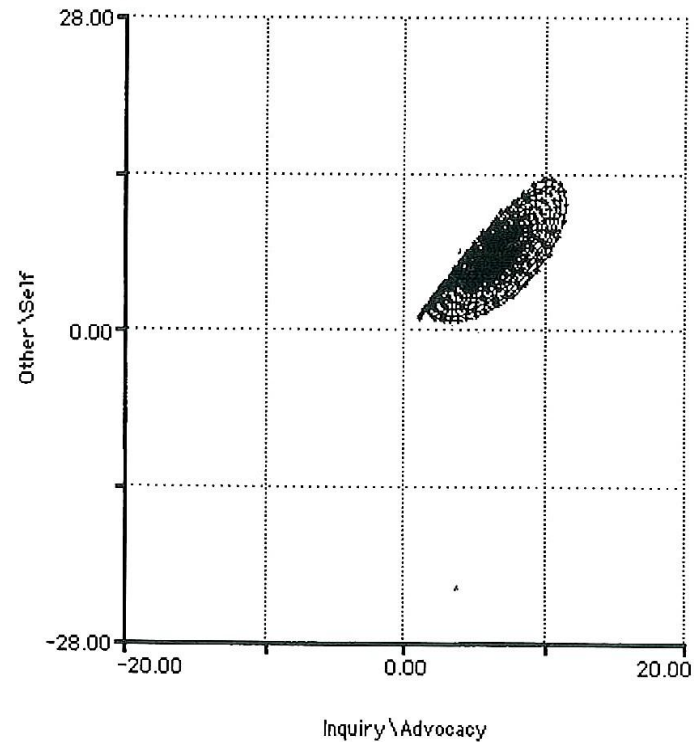


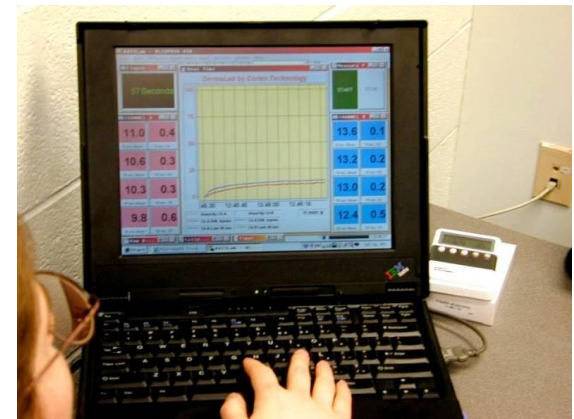
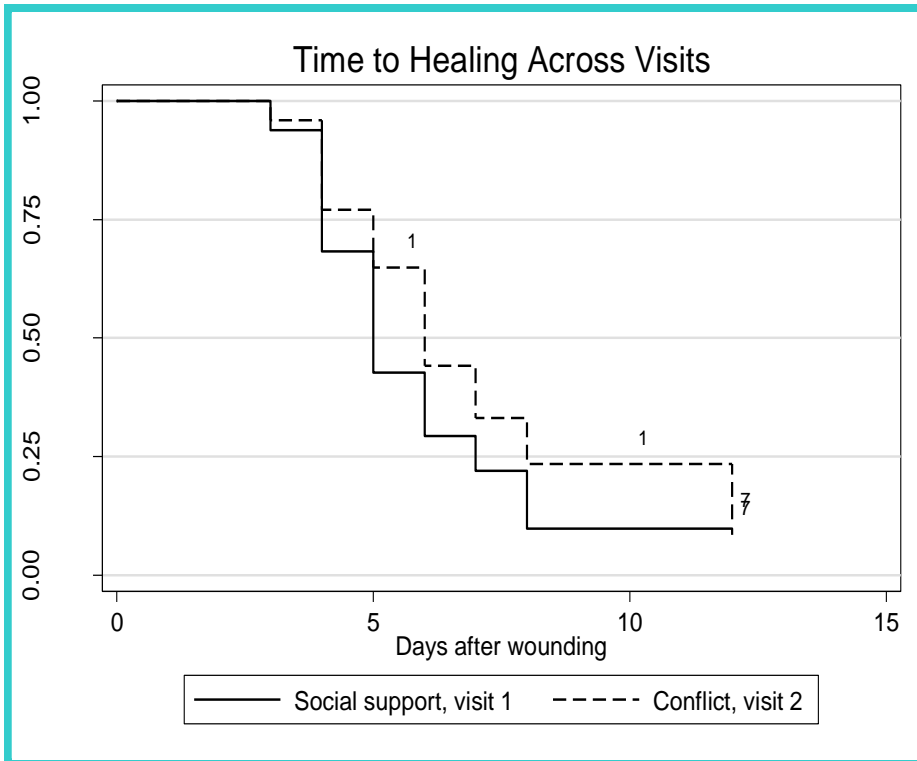
Figure 6. Phase space for low performance teams: inquire-advocacy vs. other-self.

Family Fitness

- Family Fitness is the military service member's immediate family's ability to use physical, psychological, social, and spiritual resources to prepare for, adapt to, and grow from military lifestyle demands
- Commissaries, youth centers, schools, improved family housing, employment support, spouse mentors, and career transitions support are often distinct organizational structures with separate missions, goals, oversight, and funding that represent investments by the DoD to create environmental resources that support, foster, and enrich family function.
- Metrics: The Family Assessment Device (FAD), Family Sense of Coherence (FSOC) and Family Adaptation Scale (FAS)

Family Conflict and Wound Healing:

Time to healing was 1 day later following the conflict visit than after the social support visit (day 6 vs. day 5)



Kiecolt-Glaser JK, Loving TJ, Stowell JR, Malarkey WB, Lemeshow S, Dickinson SL & Glaser R (2005). Hostile marital interactions, proinflammatory cytokine production, and wound healing. *Archives of General Psychiatry*.

Stressful events and depression slow local cytokine production, which is important for wound healing, at the wound site, while promoting maladaptive systemic proinflammatory cytokine production

Kiecolt-Glaser JK, Loving TJ, Stowell JR, Malarkey WB, Lemeshow S, Dickinson SL & Glaser R (2005). Hostile marital interactions, proinflammatory cytokine production, and wound healing. *Archives of General Psychiatry*.



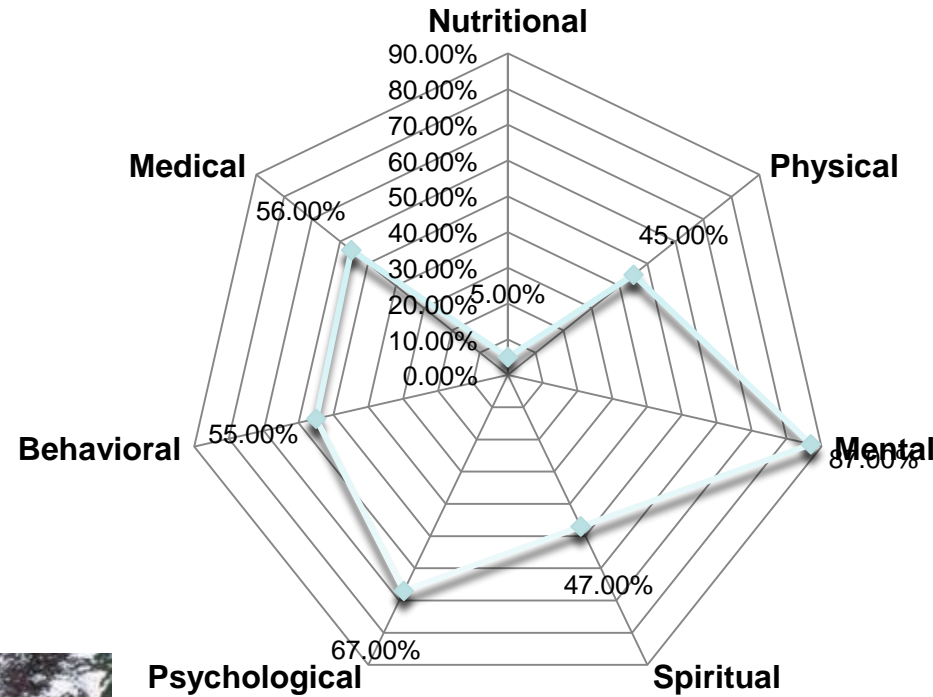
An Integrated Total Force Fitness System



Evidence Based Training



Fitness Facilitators



Fitness Metrics and Monitoring

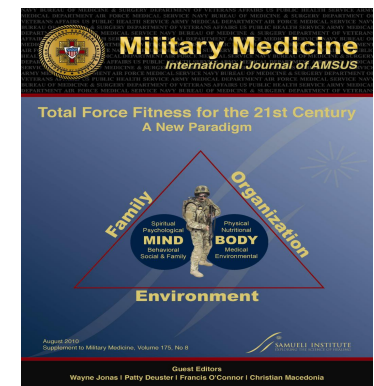
Creating Total Force Fitness in Military Operations



Products from the Total Force Fitness Workshop

- TFF Workshop Report was created and disseminated to participants of the workshop as well as to other interested individuals
- Draft CJCS Instruction for the Joint Chiefs of Staff *
- A supplemental issue in Military Medicine journal (August 4, 2010)
- New TFF doctrine in JP1 [Q4 FY2011] *

* In conjunction with human performance optimization committee OSD/HA



Total Force Fitness activities & progress since August 2010

(date of FHP 2010 and release of TFF supplement to Mil Med)

1. Chairman of the Joint Chiefs of Staff Instruction (CJCSI)

- Defines and identifies core principles of TFF, and describes the 8 domains
- Final draft completed and circulated for comment
- Comments now closed
- Coordinating office (Joint Civil-Military Operations, J-7) will reach out to Subject Matter Experts (SME) as appropriate, in response to comments received

TFF activities since 8/2010 (2)

2. Joint Test Publication (JTP) on Total Force Fitness

- JTP mechanism chosen to streamline the process (JP process requires ~2 yrs)
- Currently being authored
- All Services involved; working to develop individual chapters
- Content based on:
 - TFF supplement to Military Medicine,
 - draft CJCSI, and
 - A draft framework, which has been circulated to the Services from J7 for comments
- 8 writing groups established, consisting of:
 - A Line leader as lead,
 - At least one Line Officer and one Line NCO, and
 - SMEs across DoD
- **Anticipated release: Q4 of 2011**

TFF activities since 8/2010 (3)

3. DCoE white paper series

- Supports the development and measurement of Total Force Fitness
- Spearheaded by the Well-Being Division (provisional) Publication Campaign within DCoE's Resilience and Prevention Directorate
- Current white papers:
 - Best Practices Identified for Peer Support Programs
 - Leveraging Technology for Psychological Health and Traumatic Brain Injury
 - Integrative Mind Body Skills for Regulating the Autonomic Nervous System
 - Measures of Autonomic Nervous System Regulation
 - Worksite Health Promotion: Wellness in the Workplace
 - Review of Well-Being in the context of Suicide Prevention and Resilience
- Stay tuned for more releases in April
- Completed papers & more info on DCoE's Integrative Health & Wellness web site (<http://www.dcoe.health.mil/ForHealthPros/IntegrativeHealthWellness.aspx>)

TFF activities since 8/2010 (4)

4. Warrior Resilience Conference (WRC) III: *Total Force Fitness*

- 7-8 February 2011, Arlington VA
- Over 600 attendees, majority from the Line, well-attended from the NCO and officer levels
- Conference Goals:
 - Promote TFF as a joint strategic initiative and resilience cornerstone for achieving multi-dimensional wholeness and balance for Service members
 - Increase leader awareness of TFF
 - Provide an opportunity for line leaders to engage in experiential workshop breakout sessions

WRC III: Format

- Keynote address by ADM Mullen
- Overview of each of the 8 TFF domains by SMEs & Line leaders
- 5 Practical Application Training breakout sessions
 - Goal: deliver concrete information, practical training and tools that can be implemented in any operational environment
 - Topics : Functional Resilience Tactics, Total Family Fitness, Integrative Health Skills, Mind/Body Techniques for Resilience, Eliminating Stigma
- 8 Working Groups:
 - Focused on various combinations of TFF domains
 - Goal: generate objectives and recommendations to be employed post-conference to produce a Resiliency Training Recommendation

WRC: Products and Next Steps

Products

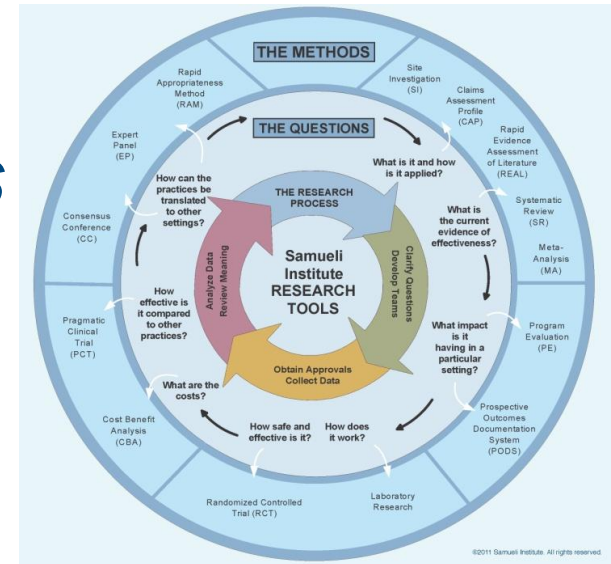
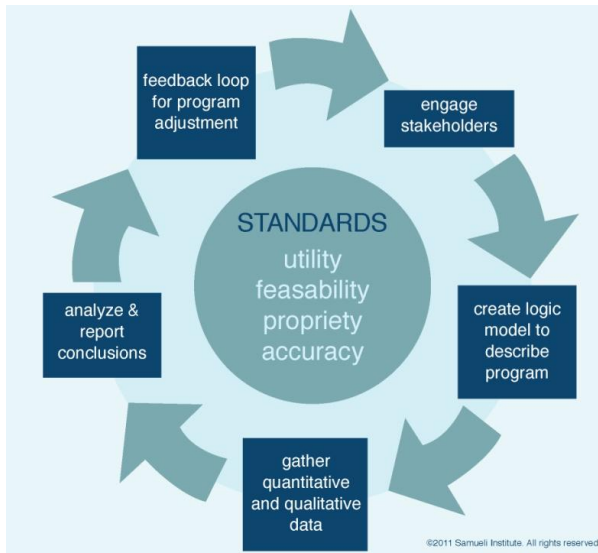
- Toolkit, including:
 - Electronic and printed TFF resources
 - Information on available and relevant programs
- Directive Type Memorandum (DTM)
- Breakout Session Metrics and Follow- up
- Consensus recommendations from each working group on
 - Recommendations for Resilience Training
 - Core Competencies of Resiliency Training
 - Potential Barriers
 - Methods to Overcome Barriers
- Resiliency Training Recommendation, compiled by a formally tasked working group including Service representatives
- Conference material videos will be available at www.warriorresilienceconference.org in April 2011.

Warrior Resilience IV

- Tentatively planned for March 29 – 30,2012, at the Renaissance Hotel, Washington, D.C.
- Topic TBD, related to TFF
- Will again target line leaders and NCOs

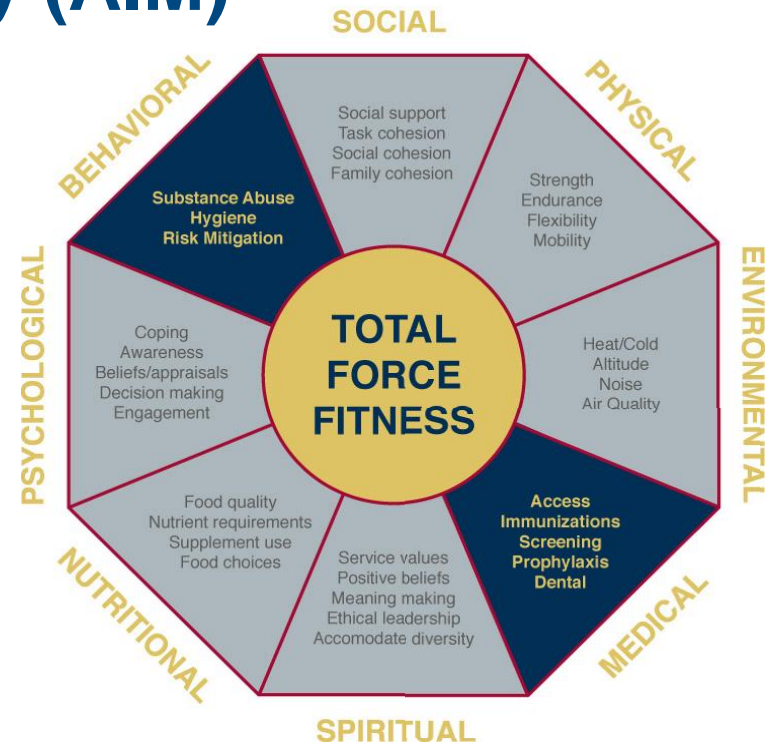
Recent Samuelli Institute activities in support of Total Force Fitness:

*an integrative
pragmatic,
whole systems
approach*



Acupuncture in the Military (AIM)

- 3 Studies of Battlefield Ear Acupuncture for Acute and Chronic Pain in the Air Force, including Implementation in the AirEvac System
- Two Randomized Trials of Acupuncture to Treat Post-Deployment PTSD and TBI at Walter Reed
- An Analysis of the Gaps between Civilian and Military Implementation of Acupuncture for Treatment and Wellness



Bottom Line:

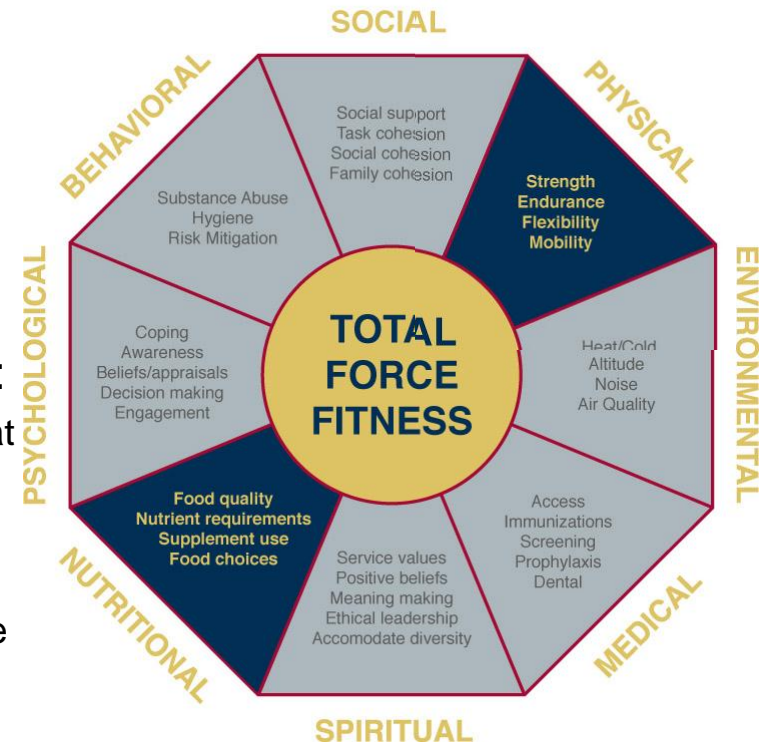
Integration of acupuncture into pain management in the military:

- Is appropriate and feasible,
- Can bolster medical fitness, and
- Improve behavioral fitness through reduced addiction risk to narcotic analgesics)



Omega-3 Fatty Acids Research Program

- NIH-DoD Symposium shows evidence of benefit for: depression, aggression, suicide risk, inflammation, cardiac health, wound healing, and other areas
- Military has the “lowest of the low” levels of O-3s
- A 3-part Project to Improve O-3 Levels in Military:
 - Modify feeds for chickens and pigs to increase O-3 in meat and eggs, and assess taste and other properties
 - Swap the resulting high O-3 meat and eggs into food supplies for garrison menus
 - Measure effect of the swap diet on O-3 serum levels in the military consumers; does not require change in food choices



Bottom Line:

O-3 supplementation may improve resilience and physical, nutritional and psychological fitness

Mind-Body Approaches in the Military

Meditation Fit for a Marine



<http://greatmarinereadingmaterial.blogspot.com>

Bottom Line

Mind-body skills:

- ☑ Can be done anytime & anywhere to enhance wellness, performance, resilience and readiness
- ☑ Are low- or no- cost
- ☑ Have few to no side effects
- ☑ Empower the Service member to choose how to experience, interpret and create meaning around “negative” and stressful experiences
- ☑ Help develop leadership qualities such as self-awareness & emotional intelligence

Research projects

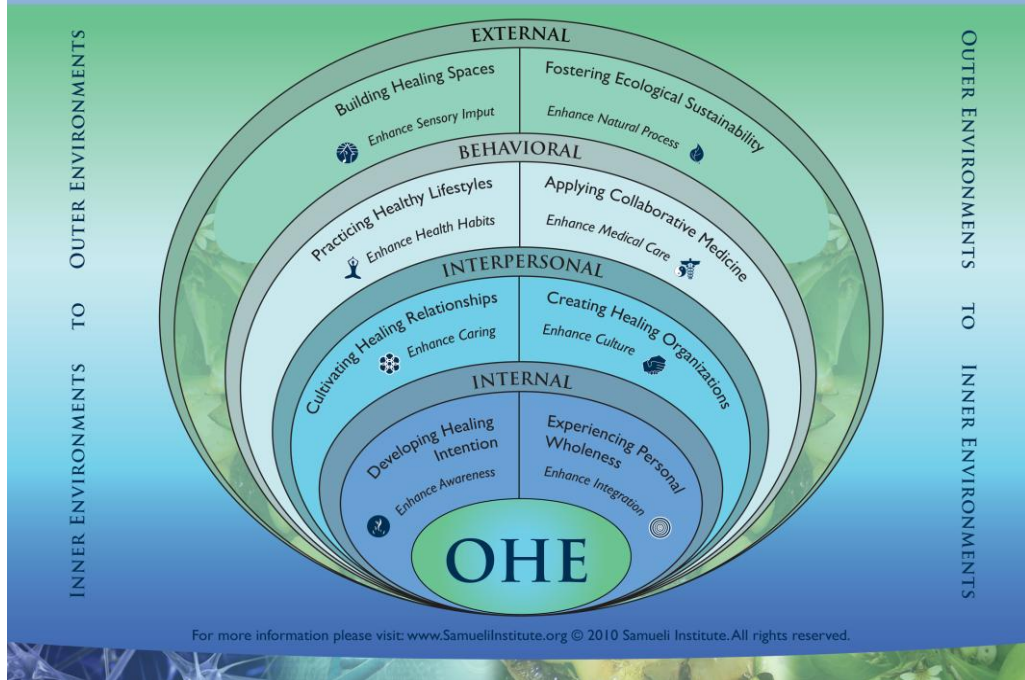
- Yoga and meditation (iRest) for soldiers with PTSD at WRAMC
- Systematic Review of MB Skills Training Programs for Resilience
- Mindfulness Meditation for Veterans with PTSD (Boston VA)
- Relaxation Response (Benson) for service members at Ft. Bliss
- Unit wide mind-body training for 4th I.D at Ft. Carson



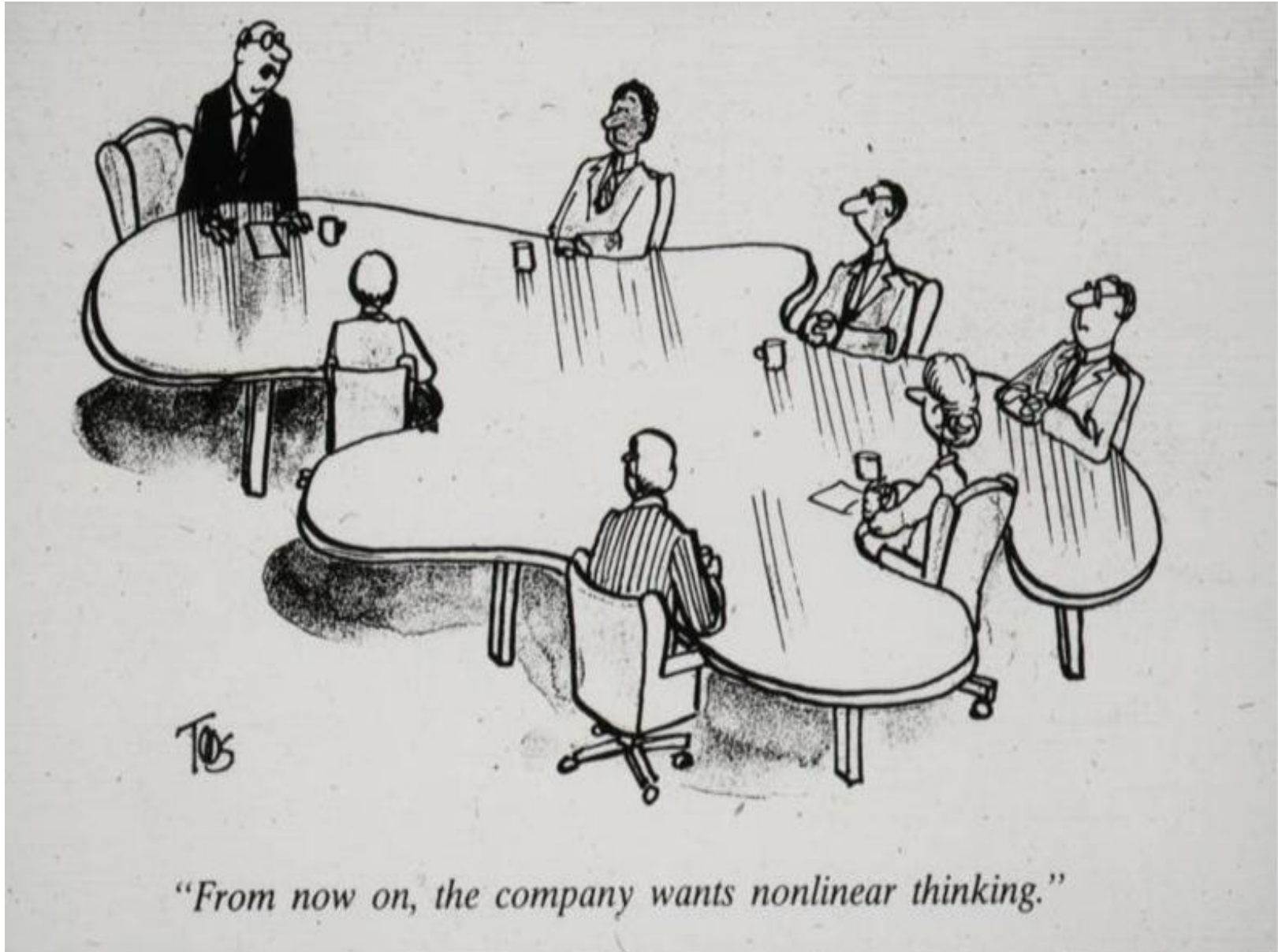
Military Family Empowerment Program



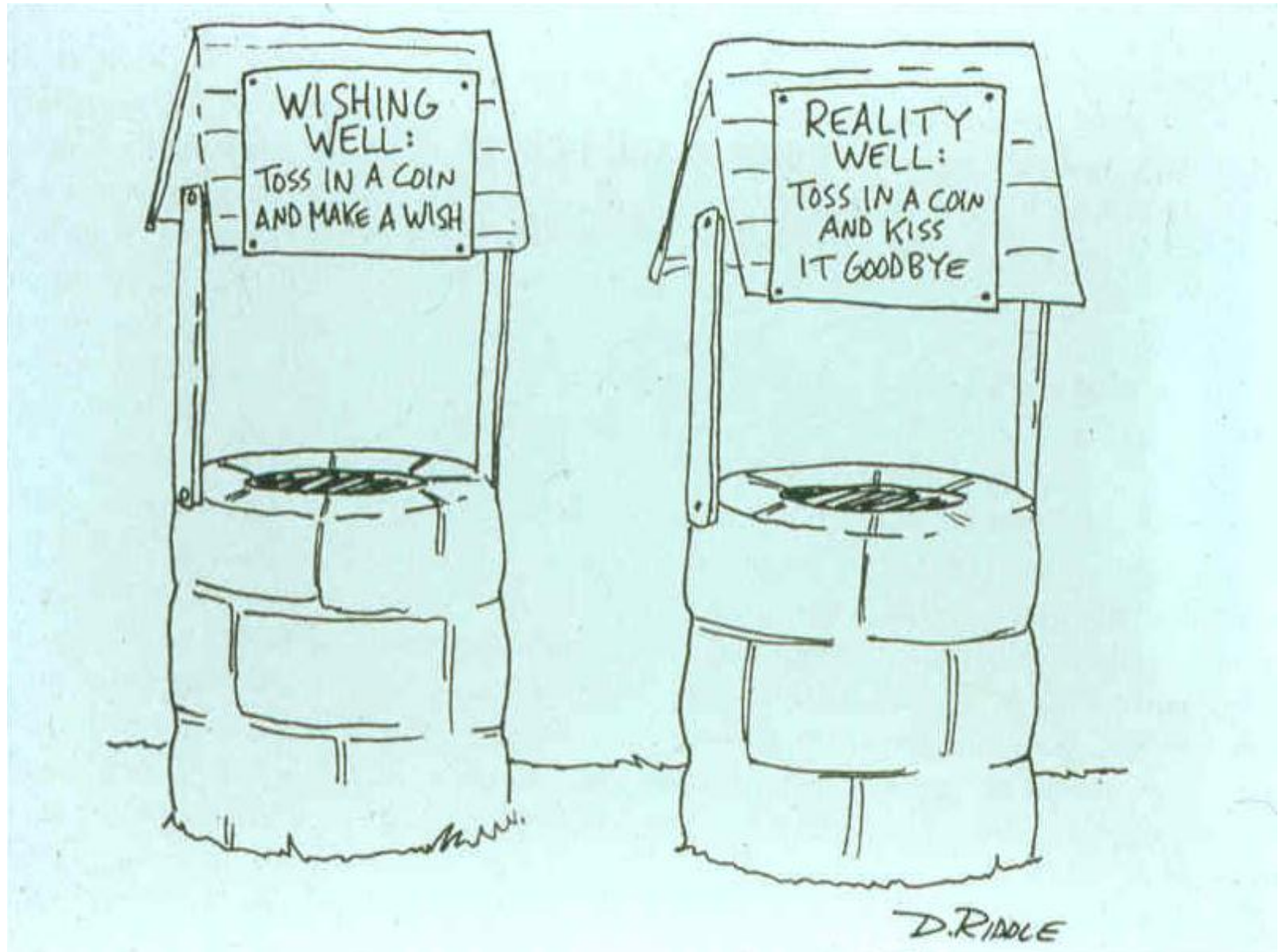
OPTIMAL HEALING ENVIRONMENTS MAKING HEALING AS IMPORTANT AS CURE



- The Military Family Needs Assessment at Ft. Bliss
- Patient and Family Centered Care and the Medical Home (Tripler, NNMC)
- The Optimal Healing Environment Framework for Implementation at the National Intrepid Center of Excellence (NICoE)



"From now on, the company wants nonlinear thinking."





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Guest Editors

Wayne Jonas | Patty Deuster | Francis O'Connor | Christian Macedonia