Preliminary Cost-Effectiveness of Transcendental Meditation (TM) for Treating PTSD in Veterans

Erik J. Groessl, PhD and Thomas Rutledge, PhD
VA San Diego Healthcare System
University of California San Diego

UC San Diego
HEALTH SCIENCES

Disclosures

- Analysis work was partially paid for by the David Lynch Foundation.

Background

- The experience of traumatic events often results in intrusive thoughts of the event, difficulty regulating emotions, arousal and sleep problems, and avoidance of cues that remind one of the trauma.
- PTSD is diagnosed when these symptoms do not diminish with time and are functionally impairing.
- PTSD often leads to a range of health problems such as depression, substance use, chronic pain, disability, suicidality, lower QOL, and higher health care costs.
- Rates of PTSD are higher in military veterans, with 22% of combat-exposed veterans in recent conflicts meeting criteria for PTSD.

Background

- Effective treatments for PTSD exist, with trauma-focused, CBT-based therapies such as (PE) and (CPT) recommended as evidence-based in recent PTSD treatment guidelines.
- However, trauma-focused therapies for PTSD often have high drop-out rates (~40%) and subsequently, high non-response rates (~ 50%)
- Transcendental Meditation (TM) is a non-trauma-focused treatment that involves the use of a mantra (sound), without concentration or contemplation.
- After a series of smaller trials, a DoD-funded trial completed in 2018 randomized 203 veterans with PTSD to either TM, PE, or PTSD health education (HE). (Nidich, 2018).

RCT Results

- The main result of the RCT was that TM was found to be non-inferior to PE, a first-line guideline-concordant psychotherapy.
- The mean decreases in CAPS-IV scores were 16.1, 11.2, and 2.5 for TM, PE, and HE respectively.
- Rates of clinically significant improvement (CAPS score decrease $\geq$ 10) were 61.2%, 41.5% and 32.3% respectively.
- Treatment non-completion rates = 25% - TM, 38% - PE, and 35% - HE.

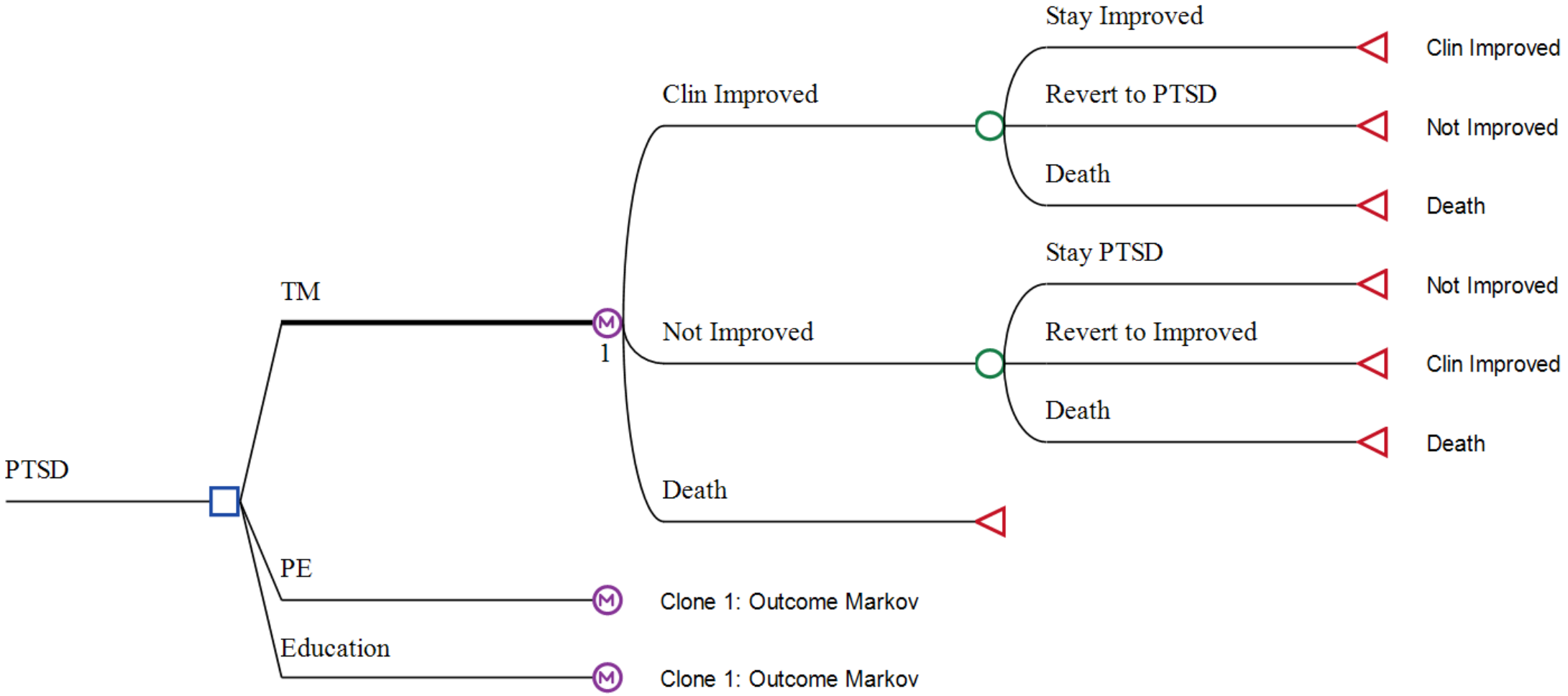
Objective

- Examine the preliminary cost-effectiveness of TM for military veterans with PTSD based on the recent trial results.
- Results considered preliminary because…
  - the analysis is based on findings from a single RCT
  - did not track participant health care utilization/ health care costs
  - limited to outcomes measured at three months.

Methods

- Markov decision model with repeated cycles to simulate response or non-response to the three study interventions over time from a healthcare organization perspective.
- In the first cycle, each participant (or cohort) accrues an estimated intervention cost
- After the first and subsequent cycles, each participant accrues Quality Adjusted Life Years (QALYs), estimated health care costs associated with intervention response or non-response.

Markov Model



Model Inputs

Inputs for the Markov Model were:

- Time Horizon: 5 years (previous analysis: Marseille 2022)
- Total Cycles: 20 3-month cycles = 5 years
- Intervention costs - various
- Health utility values – derived from scientific literature
- Health care costs - derived from scientific literature
- Mortality Rates – age 47, 83% male, CDC tables, (Nilaweera 2023)
- Reversion rate - 2.5% /3-mo cycle (Mavranezouli 2020)
- Inflation: Costs adjusted to 2023 US$ - (US CPI calculator)
- Discount rate: 3% annual (convention for CEA) – (Neumann 2017)

Intervention Cost Estimates

- TM cost - $1,504/participant
  - TM administrators in $2023 plus small add-on for scheduling
- PE cost - $2,822/participant
  - Mavranezouli et al. 2020 – CEA of psych treatments for PTSD
  - Adjusted for 12 90-minute sessions, $US, and to $2023
- HE cost - $492/participant
  - Groessl et al. 2016 – LIFE Study
  - adjusted for # sessions and to $2023

Effectiveness and Health Utility Values

- Rates of clinically significant improvement (CAPS score decrease $\geq$ 10) - 61% (TM), 41% (PE), and 32% (HE).
- Health Utility
  - Values range from 0 to 1.0
  - Lack of good estimates
  - Some recent studies have used complex and wide-ranging values (Marseille 2022)
  - Mavranezouli et al. 2020 – conservative values –
    - 0.63 - clinically improved
    - 0.54 - not clinically improved

Cost Estimates – health care costs

- Harper et al. 2022
  - costs for 1,377 VA patients with and without PTSD were tracked
- Adjusting for inflation
  - $12,154 annually for with PTSD
  - $7,855 annually for without/resolved PTSD

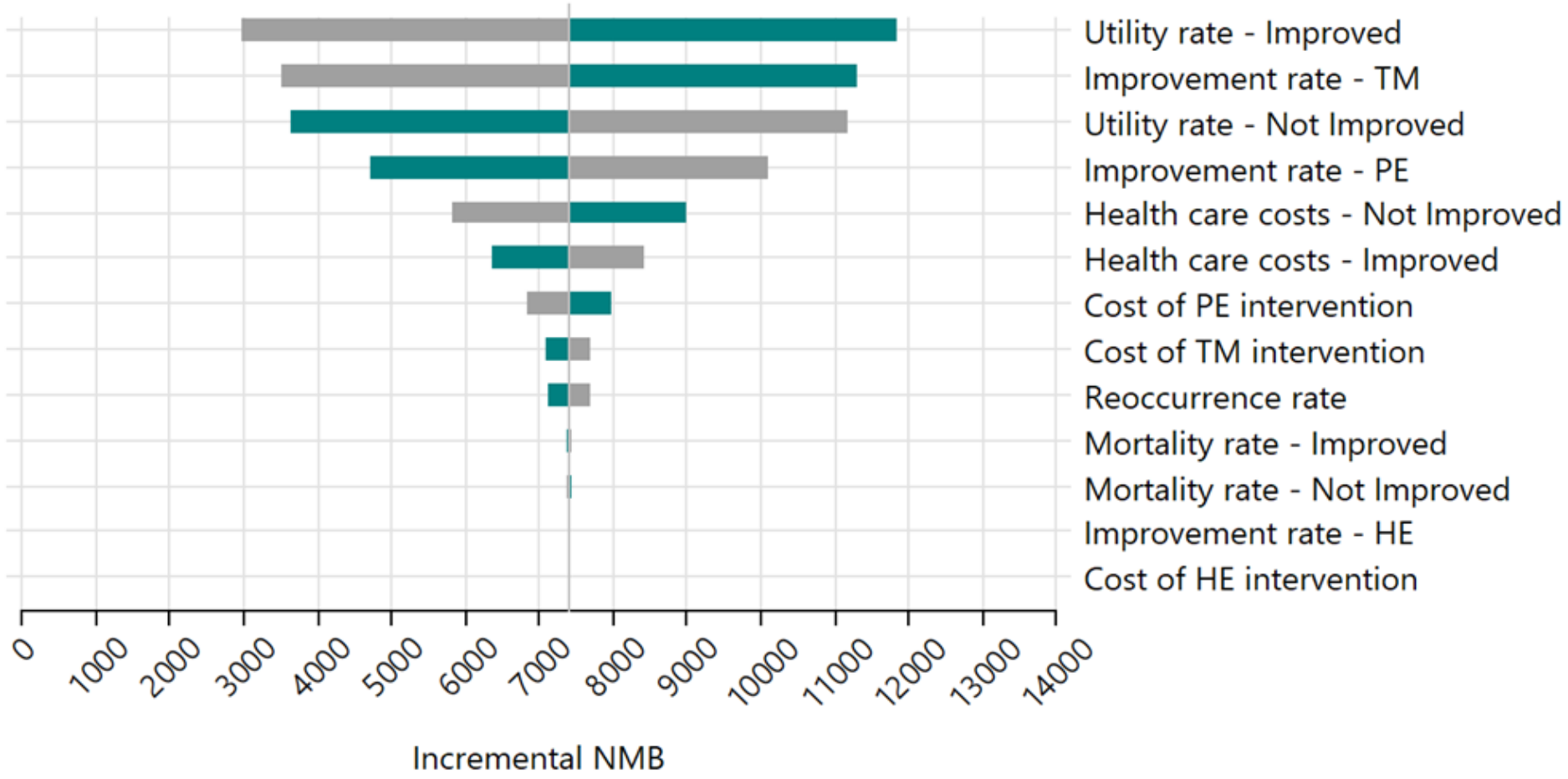
Sensitivity Analysis

- Model inputs were varied to examine the sensitivity of the results to variation in model inputs.
  - inputs were varied using 95% confidence intervals when available
  - or + or - 20% in either direction
- A probabilistic sensitivity analysis (PSA) was conducted
  - Monte Carlo procedure with 5000 simulations
  - inputs values were randomly selected from variable distributions

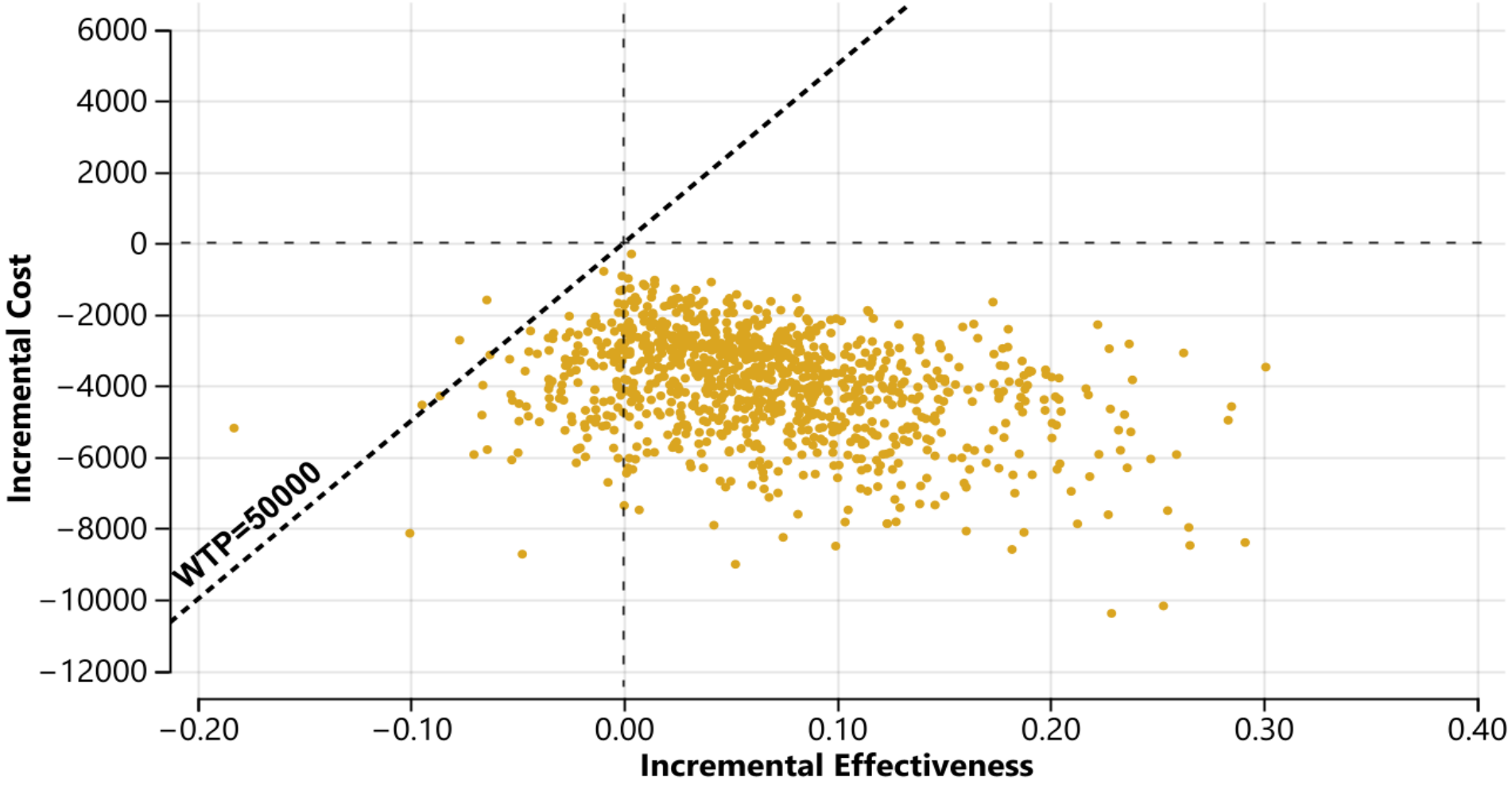
Main Results

	HE	TM	PE	Difference TM vs HE	Difference TM vs PE	Difference PE vs HE
Effectiveness						
-rate of clinical improvement	0.32	0.61	0.42	0.29	0.19	0.10
-QALYs	2.60	2.70	2.63	**0.10**	**0.07**	**0.03**
Costs						
-Intervention costs	$492	$1,504	$2,822	$1,012	-$1,318	$2,330
-Consequent health care costs	$48,218	$43,968	$46,753	-$4,250	-$2,785	-$1,465
Total Costs	**$48,710**	**$45,472**	**$49,575**	**-$3,238**	**-$4,103**	**$865**
ICER				**dominant**	**dominant**	**$28,833**
Incremental NMB				**$8,267**	**$7,397**	**$870**

Sensitivity Analysis



ICER Scatterplot



Summary

- TM was the dominant treatment strategy
- TM was more effective - clinical improvement in PTSD, results in lower subsequent hc costs, saving money long-term
- Savings per person are means from all participants and thus can be multiplied by a cohort
- Limitations include a single RCT, estimates, and 3-month outcomes

References

1. Nidich S, Mills PJ, Rainforth M, et al. Non-trauma-focused meditation versus exposure therapy in veterans with post-traumatic stress disorder: a randomised controlled trial. Lancet Psychiatry. 2018;5(12):975-986.
2. Neumann PJ, Sanders GD, Russell LB, Siegel JE, Ganiats TG. Cost-Effectiveness in Health and Medicine. Second ed. New York, NY: Oxford University Press; 2017.
3. Nilaweera D, Phyo AZZ, Teshale AB, et al. Lifetime posttraumatic stress disorder as a predictor of mortality: a systematic review and meta-analysis. *BMC psychiatry.* 2023;23(1):229.
4. Mavranezouli I, Megnin-Viggars O, Grey N, et al. Cost-effectiveness of psychological treatments for post-traumatic stress disorder in adults. PloS one. 2020;15(4):e0232245.
5. US Department of Labor. Bureau of Labor Statistics. May 2019 National Occupational Employment and Wage Estimates. https://www.bls.gov/oes/current/oes_nat.htm#29-0000. Published 2021. Accessed January 28, 2021.
6. U.S. Bureau of Labor Statistics. CPI Inflation Calculator. 2023.
7. Groessl EJ, Kaplan RM, Castro Sweet CM, et al. Cost-effectiveness of the LIFE Physical Activity Intervention for Older Adults at Increased Risk for Mobility Disability. J Gerontol A Biol Sci Med Sci. 2016.
8. Harper KL, Moshier S, Ellickson-Larew S, et al. A prospective examination of health care costs associated with posttraumatic stress disorder diagnostic status and symptom severity among veterans. Journal of traumatic stress. 2022;35(2):671-681.
9. Neria Y, al. e. Transcendental Meditation in Veterans and First Responders With PTSD. (Trial registration). ClinicalTrials.gov. https://clinicaltrials.gov/study/NCT05645042. Published 2022. Accessed 2023.