

Cost-Effectiveness of Acupuncture for Combat-Related Post-Traumatic Stress Disorder



EE126

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BACKGROUND

- Post-Traumatic Stress Disorder (PTSD) affects millions of Americans but remains under-treated for a variety of reasons such as lack of treatment efficacy or difficulty with diagnosis¹⁻⁴
- PTSD has a high clinical and economic burden, estimated to cost the United States (US) economy 230 billion dollars in societal costs⁵
- Non-traditional therapies such as Acupuncture (Acu) are being explored to combat undertreatment. However, the economic value of acupuncture versus placebo or cognitive processing therapy (CPT) is unclear
- CPT was chosen as a comparator due to being accessible, affordable, session-based and recommended as a first line therapy for PTSD³

OBJECTIVE

Determine the cost-effectiveness of Acupuncture compared to placebo and CPT

METHODS

- A decision tree was used to distribute patients into four Markov states representing PTSD Severity states after treatment (Acu/CPT/Placebo)
- Average post-treatment CAPS-5 scores were used to determine patient distributions by PTSD Severity State using established cut-offs⁸

Figure 1: Decision Tree

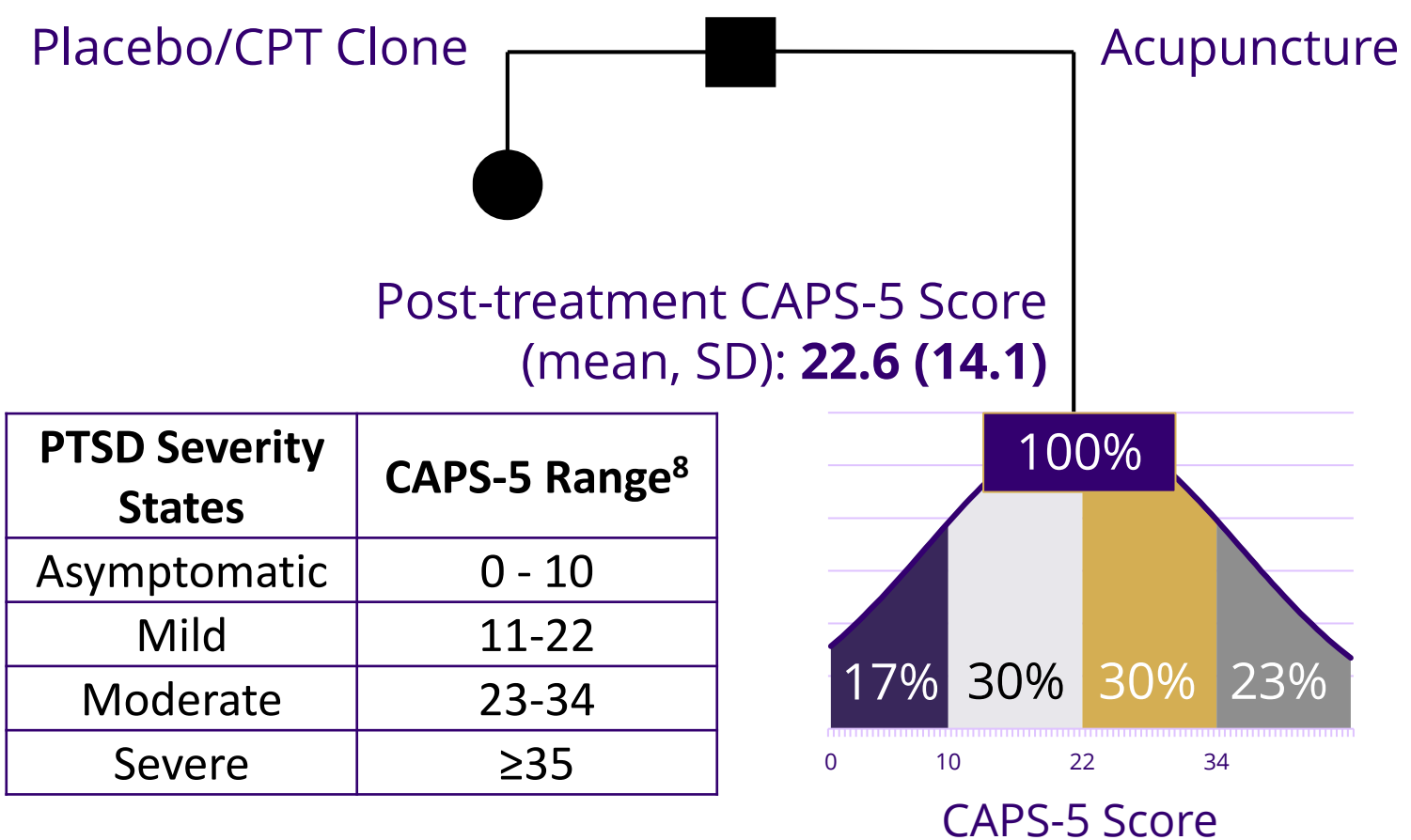


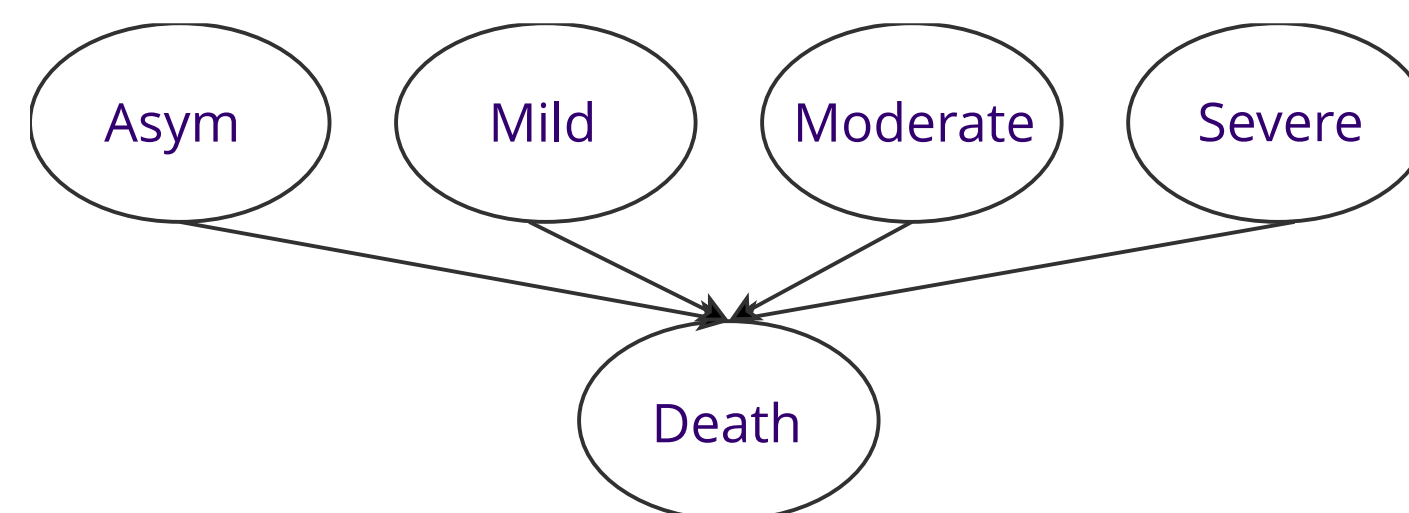
Table 1: Base Case Post-Treatment Distributions

PTSD Severity State	Placebo	CPT	Acu
Mean CAPS-5 (SD) ^{6,7}	29.1 (11.8)	25.4 (13.7)	22.6 (14.1)
Asymptomatic	5%	14%	17%
Mild	22%	32%	30%
Moderate	40%	31%	30%
Severe	33%	23%	23%

MARKOV MODEL

- 5-state Markov Model (Asymptomatic [Asym], Mild, Moderate, Severe PTSD & Death)
- Healthcare system perspective; direct medical care costs
- Yearly cycle over a lifetime horizon
- **Key Assumption:** Due to lack of long-term treatment data, patients were assumed to permanently stay in their assigned post-treatment PTSD severity state
- Patients accrue the costs and mortality risks of the assigned PTSD severity state in 1-year cycles until death.
- Outcomes are reported as: Total Lifetime Costs; Quality-Adjusted Life-Years (QALYs); Incremental Cost-Effectiveness Ratios (ICERs)
- Uncertainty was evaluated using a one-way sensitivity analysis (OWSA) and a probabilistic sensitivity analysis (PSA) using 1,000 Monte Carlo iterations.

Figure 2: Markov Model



Model Assumptions

- Normal Distribution of post-treatment CAPS-5 Scores⁹
- No formal re-treatment since it's unlikely that patients will re-take an entire "course" of Acupuncture or CPT

Table 2: Key Model Inputs⁸

Category	Input Parameter	Value (+/- Range)
Increased Risk of PTSD Mortality	All-Cause Mortality Multiplier	1.47 (1.06 - 2.04)
	Suicide Mortality Multiplier	2.09 (1.11 - 3.94)
PTSD Severity State Health Utilities	Asymptomatic	0.90 (0.85 - 0.94)
	Mild	0.83 (0.79 - 0.87)
	Moderate	0.74 (0.70 - 0.78)
	Severe	0.61 (0.57 - 0.65)
PTSD Severity State Costs (Annual)	Asymptomatic	\$5,090 (\$2.9 - 7.8k)
	Mild	\$10,200 (\$5.8 - 16k)
	Moderate	\$14,070 (\$8 - 22k)
	Severe	\$20,800 (\$12 - 32k)
Treatment Costs ^{9,10*}	CPT Course ⁹ (12 sessions)	\$2,000
	CPT Intake Assessment ⁹	\$170
	Acu Course ¹⁰ (24 sessions)	\$4,080 (\$495 - \$9.3k)

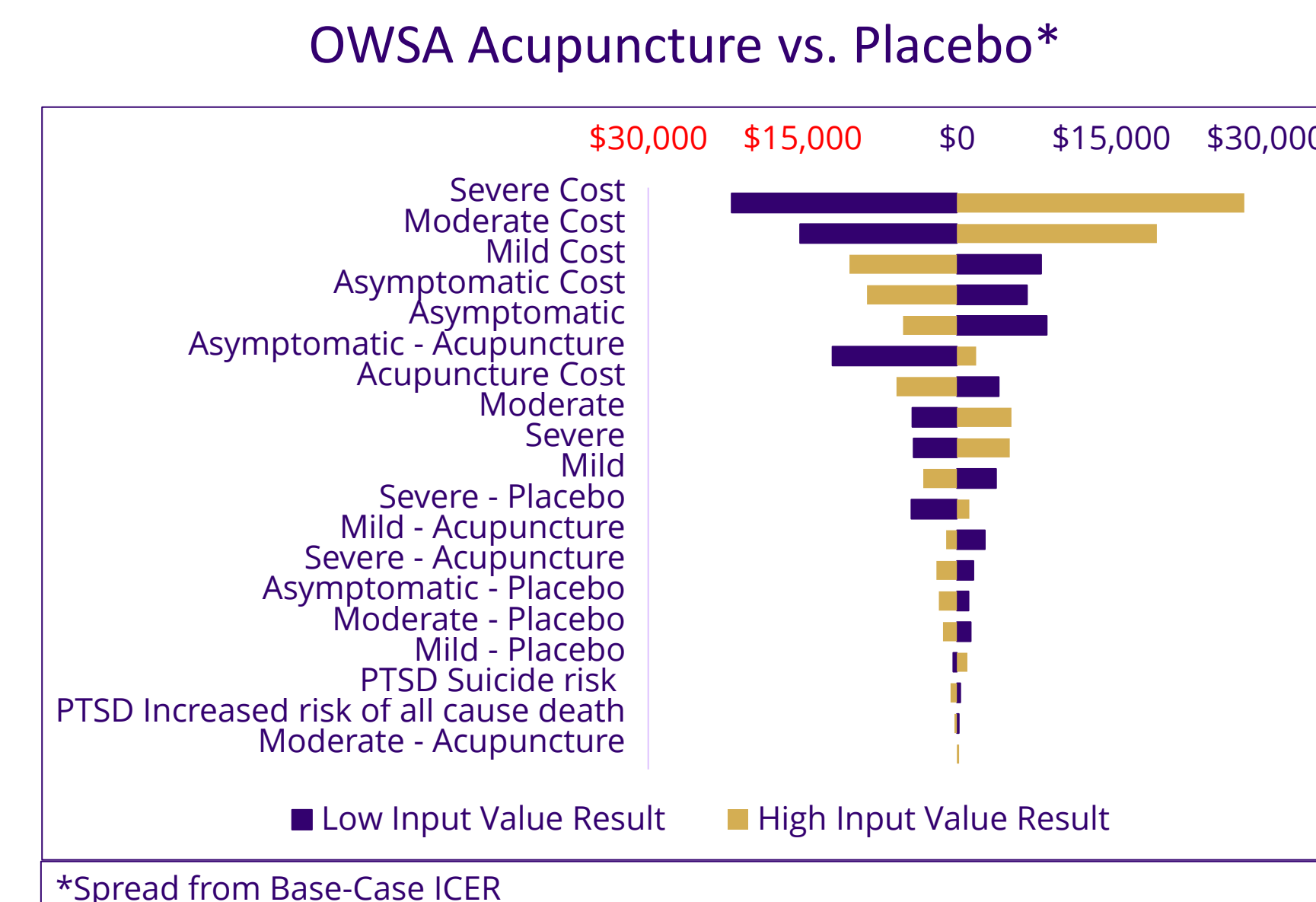
*All costs inflated to 2026 U.S. Dollars for Model Input¹³

RESULTS

Table 2: Base Case Deterministic Results

	Total Costs	Total QALYs	ΔCosts	ΔQALYs	ICER
Acupuncture	\$289,800	16.84	-	-	Acupuncture Dominates
Placebo	\$332,200	15.95	-\$42,400	0.80	
CPT	\$290,100	16.81	-\$10,800	0.03	

Figure 3: ICER Tornado Diagram



*Spread from Base-Case ICER
Due to the assumption of static health states, deterministic model outcomes were most sensitive to the **long-term cost of managing the different PTSD Severity States** since the uncertainty of long-term acupuncture effectiveness is only represented once, immediately post-treatment

LIMITATIONS

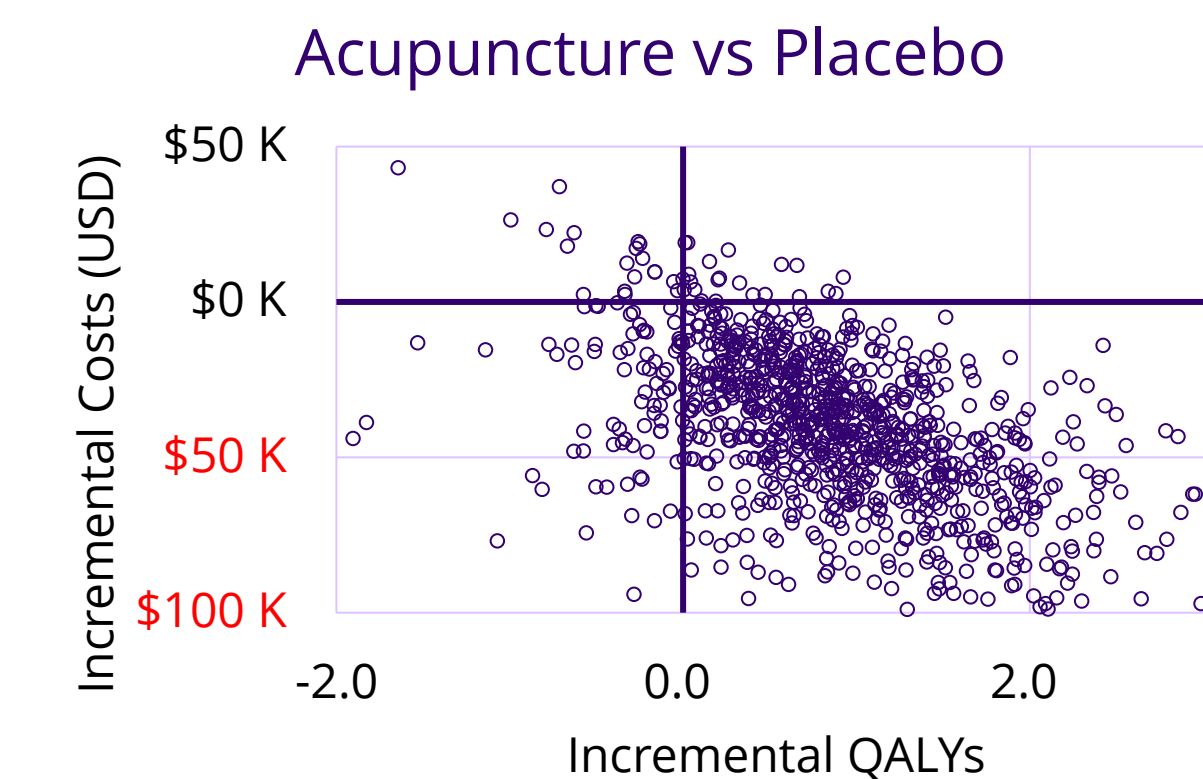
- **Key Model Assumptions:** Several model assumptions were made due to lack of long-term data that prevent us from reflecting PTSD disease course (static health states, normal distribution of post-treatment CAPS-5 Scores, and extrapolation of a single intervention to lifetime outcomes)
- **High Uncertainty:** Due to lack of long-term data and clinical trials, uncertainty in long-term effectiveness is not well reflected in the model; patient distributions & efficacy/cost estimates have wide ranges.

CONCLUSION

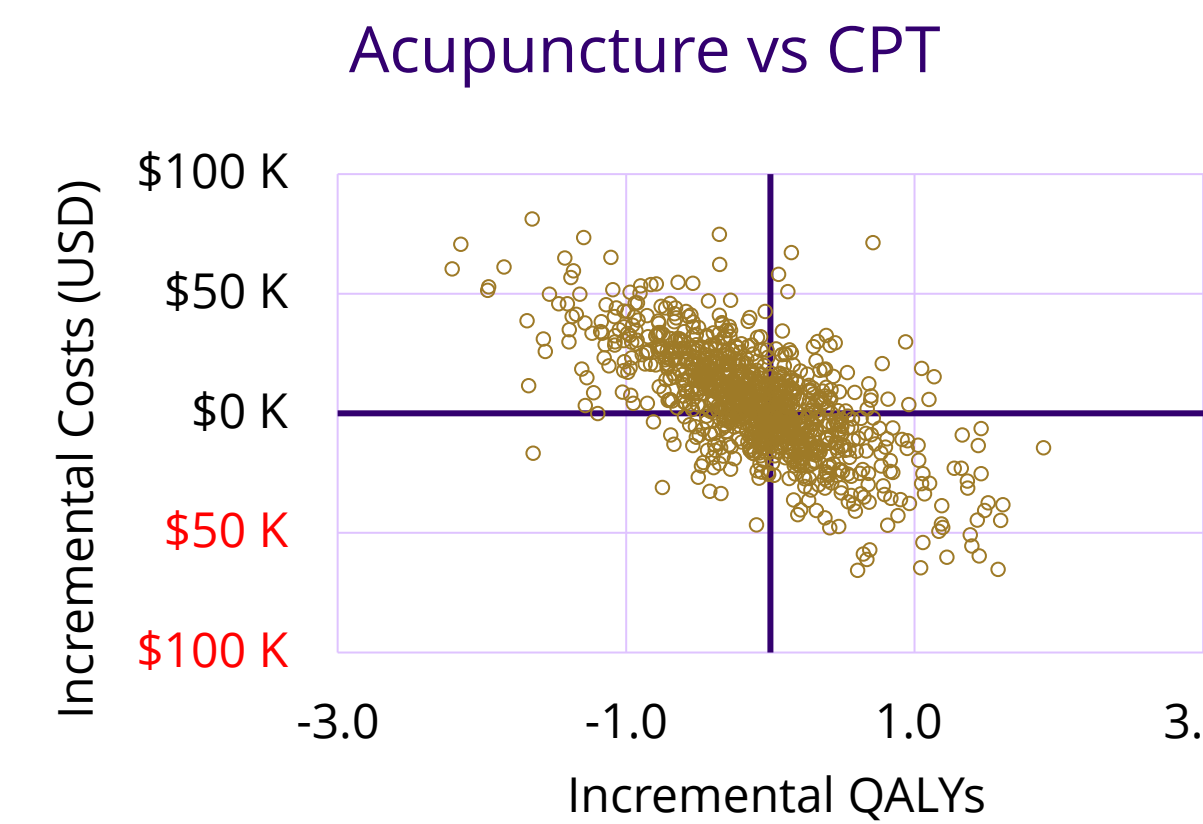
According to our preliminary analysis, **Acupuncture is both cheaper and more effective than no active treatment (Placebo)**
Although our base case analysis shows Acupuncture as dominant over CPT, our PSA demonstrates that **Acupuncture and CPT may provide similar clinical and economic value**

Figure 4: Cost-Effectiveness (CE) Planes

Parameter uncertainty was modeled using Gamma distributions for costs, Beta for utilities, and Dirichlet for patient distributions.



Acupuncture is less costly and more effective than Placebo



The CE plane shows a tight cluster around the origin indicating high uncertainty and **similar economic/clinical efficacy between Acupuncture and CPT**

Implications for Payers and Patients:

- Acupuncture may offer a cost-effective therapy alternative for patients unable to use traditional cognitive therapies.

References & Contact

