



Beyond the Cliff: Exploring the Full Spectrum of Behavioral Insomnia Care Options

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Carpe Noctem!


COI Disclosure

Relationships with financial sponsors:

- **Direct financial relationships:** PSQI-A Royalties, University of Pittsburgh

- **Other: Financial relationships/equity/investments:** NOCTEM Health, Inc. I am the founder & CEO, and I own equity in **NOCTEM Health, Inc.**, which developed and commercializes the **COAST** clinical decision support platform for remote patient monitoring in behavioral sleep care mentioned in this presentation.

COI Mitigation

1. Slides that mentions materials related to this conflict of interest are marked 
2. The following **independent references** are provided as support for this presentation. Additional references are included in this presentation.
 - Edinger JD, Arnedt JT, Bertisch SM, et al. Behavioral and psychological treatments for chronic insomnia disorder in adults: an American Academy of Sleep Medicine clinical practice guideline. *J Clin Sleep Med*. 2021;17(2):255-262.
 - Mysliwiec V, Martin JL, Ulmer CS, Chowdhuri S, Brock MS, Spevak C, Sall J. The Management of Chronic Insomnia Disorder and Obstructive Sleep Apnea: Synopsis of the 2019 U.S. Department of Veterans Affairs and U.S. Department of Defense Clinical Practice Guidelines. *Ann Intern Med*. 2020 Mar 3;172(5):325-336. doi: 10.7326/M19-3575. Epub 2020 Feb 18. Erratum in: *Ann Intern Med*. 2021 Apr;174(4):584. PMID: 32066145.
 - Qaseem A, Kansagara D, Forcica MA, Cooke M, Denberg TD; Clinical Guidelines Committee of the American College of Physicians. Management of Chronic Insomnia Disorder in Adults: A Clinical Practice Guideline From the American College of Physicians. *Ann Intern Med*. 2016 Jul 19;165(2):125-33. doi: 10.7326/M15-2175. Epub 2016 May 3. PMID: 27136449.
 - Lewis CC, Boyd M, Puspitasari A, Navarro E, Howard J, Kassab H, Hoffman M, Scott K, Lyon A, Douglas S, Simon G, Kroenke K. Implementing Measurement-Based Care in Behavioral Health: A Review. *JAMA Psychiatry*. 2019 Mar 1;76(3):324-335. doi: 10.1001/jamapsychiatry.2018.3329. PMID: 30566197; PMCID: PMC6584602.

Learning Objectives

1. Contextualizing the insomnia problem.
2. Review the current practice parameters for the management of insomnia in adults.
3. Detail the evidence base supporting different approaches to the delivery of CBTI.
4. Describe a proposed enhanced stepped care model for the management of insomnia.

Decades of work to successfully increase sleep health awareness...



DARIUS FOROUX

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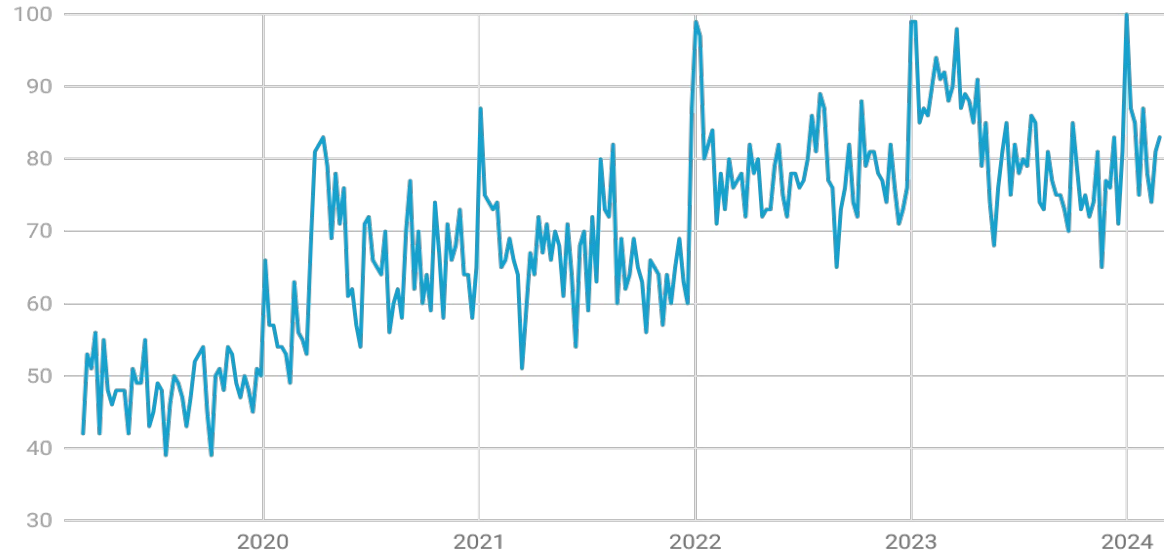
Have amplified the prevalence (recognition?) of insomnia.



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2020-2024 Increased Interest in “Insomnia”

Online searches for "insomnia symptoms"



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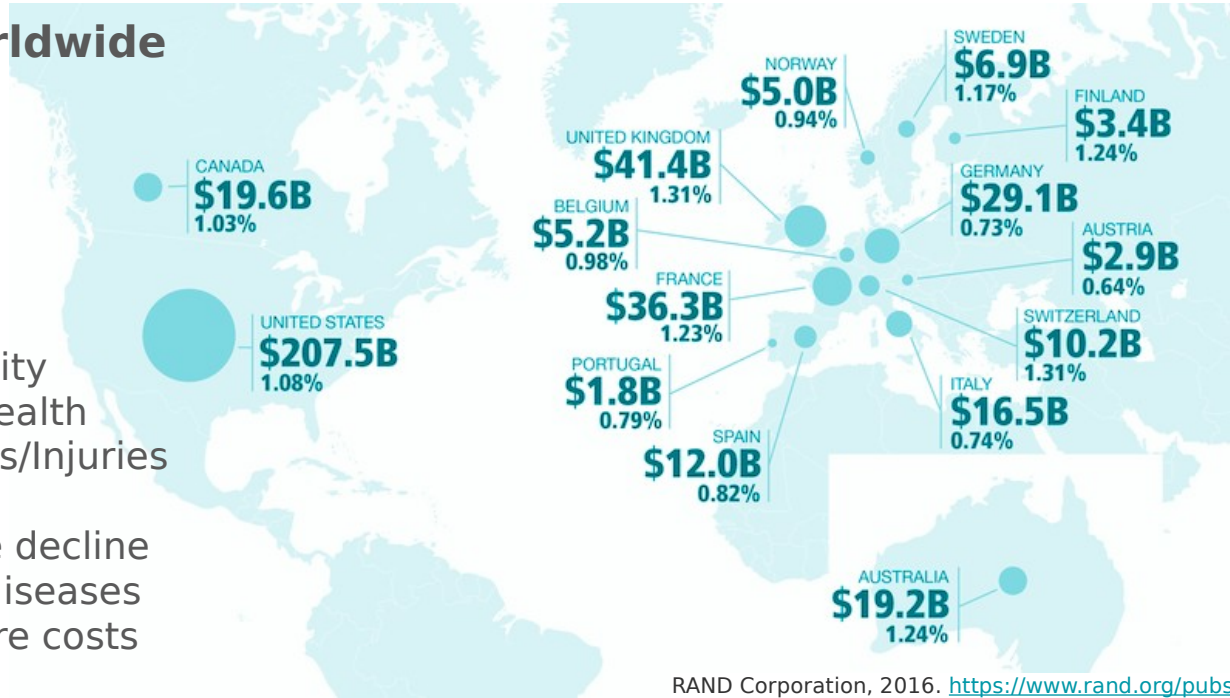
<https://www.helsestart.no/news/global-insomnia-statistics>. Retrieved 2/28/2025

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Insomnia a global epidemic: The demand for care will not abate.

1.5B Worldwide

- ↓ Income
- ↓ Productivity
- ↓ Mental Health
- ↑ Accidents/Injuries
- ↑ Stroke
- ↑ Cognitive decline
- ↑ Chronic diseases
- ↑ Healthcare costs



RAND Corporation, 2016. https://www.rand.org/pubs/research_reports/RR1791.html.
RAND Corporation, 2023. https://www.rand.org/pubs/research_reports/RAA2166-1.html

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Cognitive Behavioral Therapy for Insomnia (CBTI) is the first-line recommended treatment.



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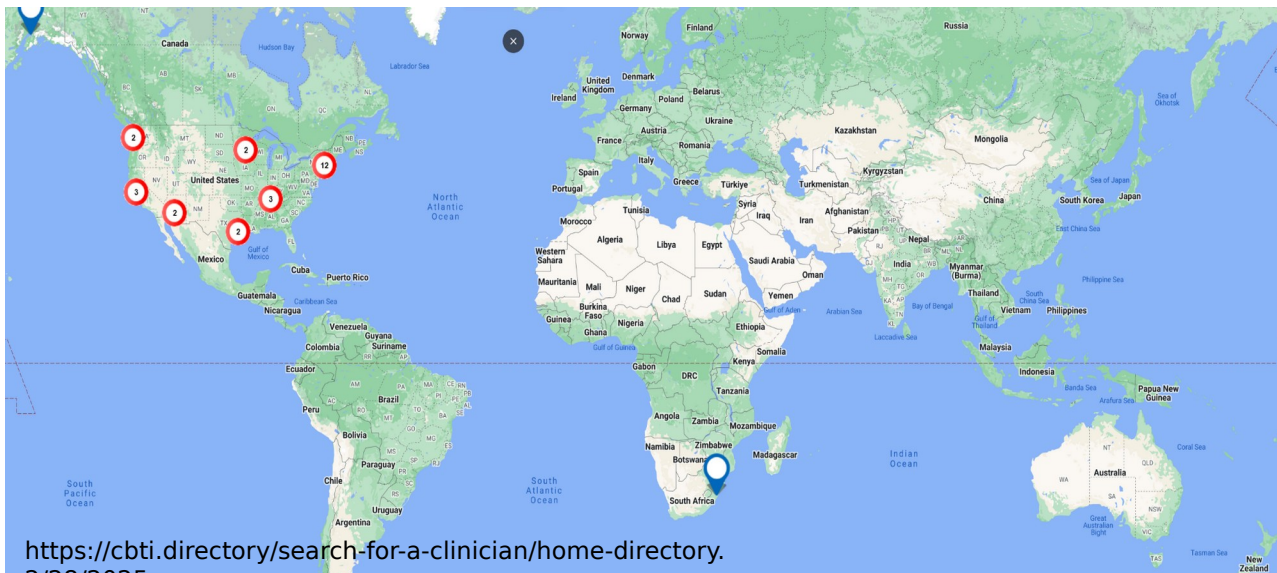
AASM Recommendations (2022)

- **Full package CBTI** (education, stimulus control, wake restriction, cognitive restructuring, relaxation, relapse prevention)
- Full package brief CBTI (1-4 sessions; education, stimulus control, wake restriction)
- Stimulus control (education, only use bed for sleep)
- Wake (Sleep) restriction (education, regular and limited opportunity for sleep)
- Relaxation (reduce arousal)
- DO NOT USE SLEEP HYGIENE AS A TREATMENT OF INSOMNIA.

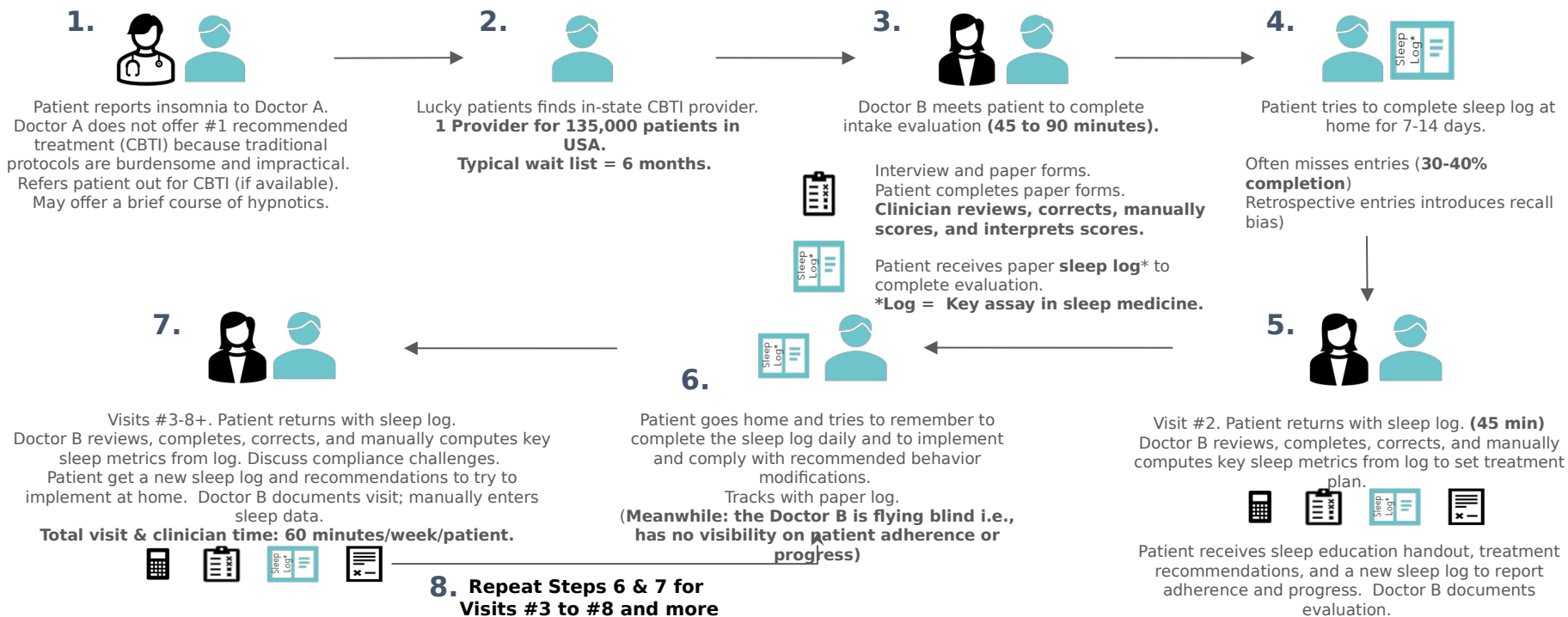
Edinger et al., Behavioral and psychological treatments for chronic insomnia disorders in adults: an AASM clinical practice guidelines. *Journal of Clinical Sleep Medicine*, 17(2), 2022.

CBTI is not readily accessible...

343 Providers Worldwide



... nor is it scalable in most real-world clinical settings.



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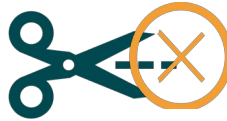
Barriers point to strategies to scale the reach and access of CBTi.

“Too few providers!”



Empower a wider range of providers

“Burdensome Protocols!”



Match patients' insomnia care needs to “dose” of CBTi

“Limited Reach!”



Optimize remote monitoring and management capabilities

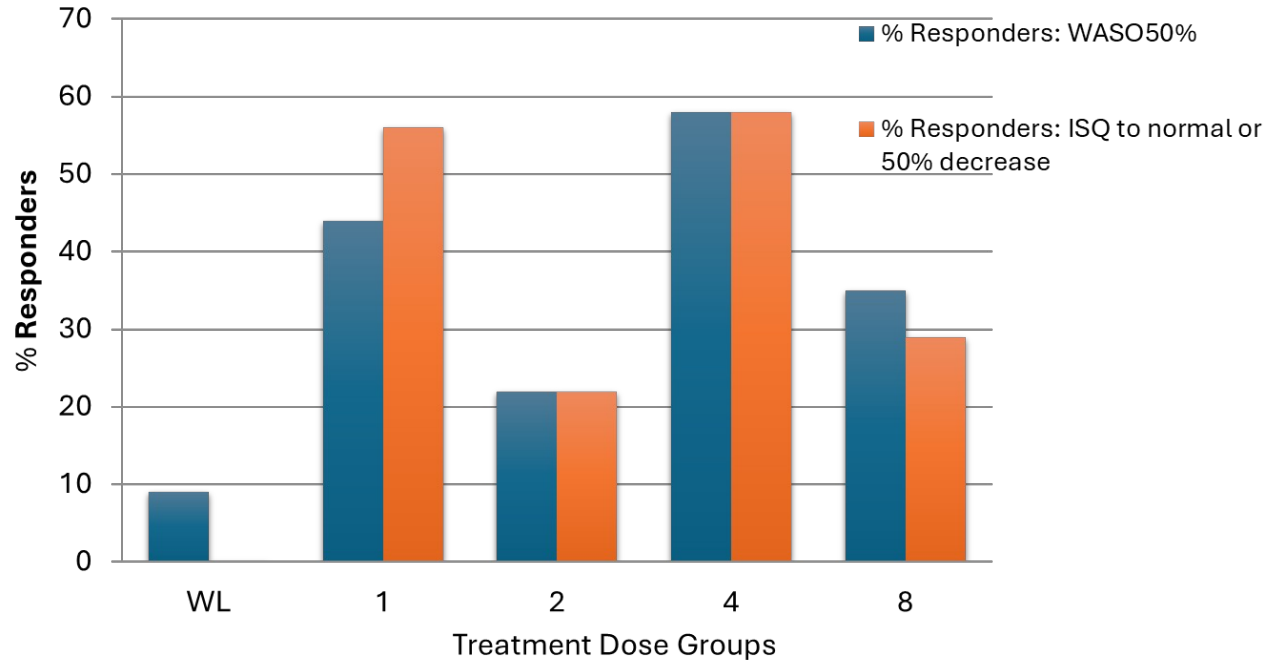
“Limited Scalability!”



Leverage tech to optimize personalized care and patient engagement.

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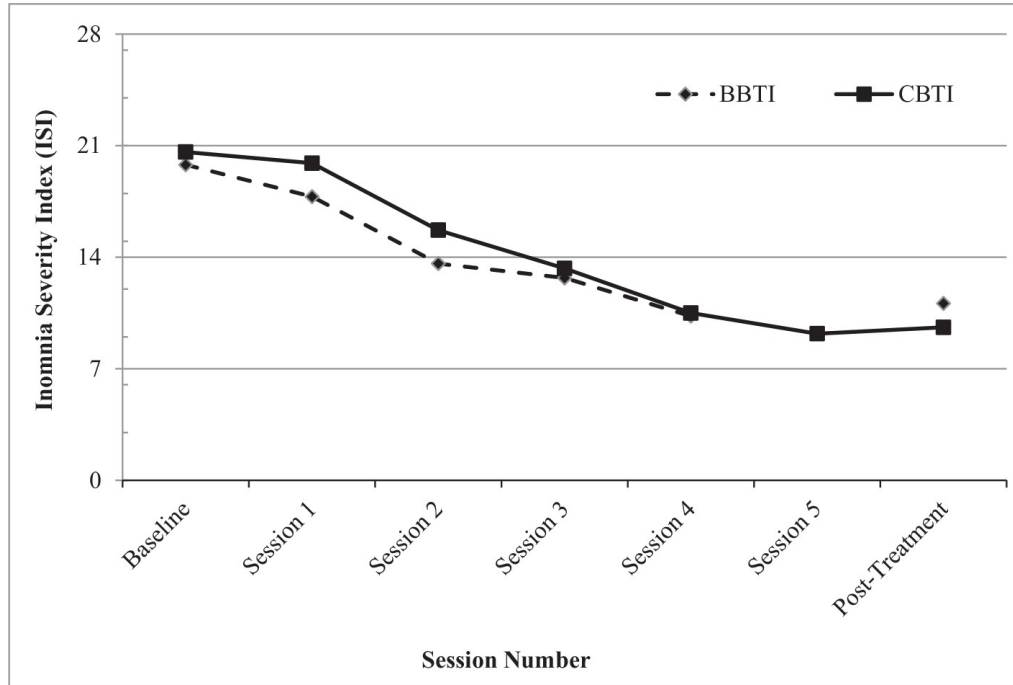
We know about CBTi “dose” optimization:



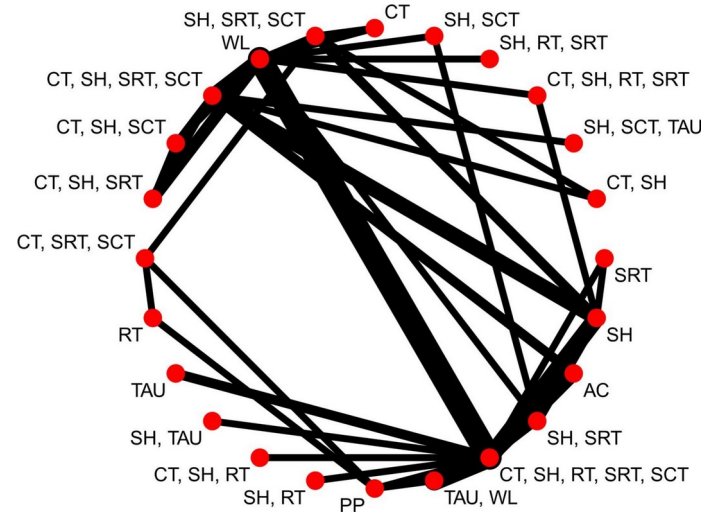
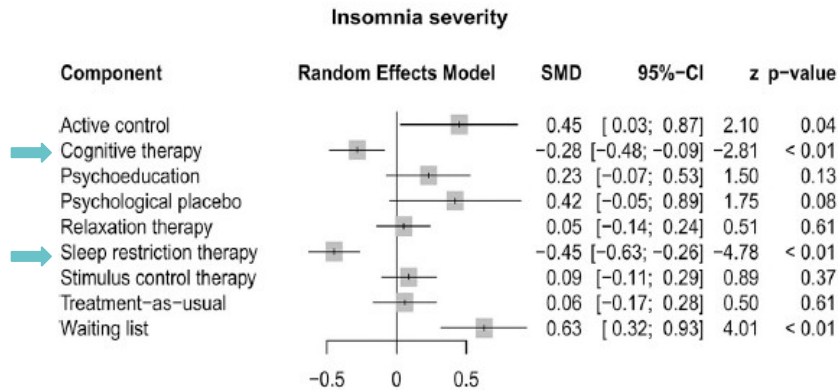
Edinger et al., SLEEP, 2007

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Does length matter? CBTI vs. BBTI



What exactly works? What does not?

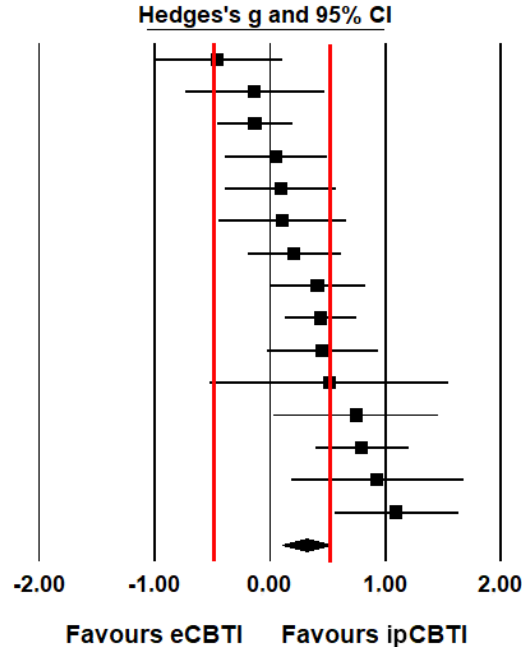


Steinmetz et al., Clin Psych Review, 2024

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In-Person vs. Telehealth or Self-Help App?

Study name	g	SE
Gieselmann, 2019	-0.452	0.283
Gehrman, 2021	-0.133	0.307
Wong, 2021	-0.130	0.168
deBruin 2015/2018	0.049	0.226
Arnedt, 2021	0.094	0.245
Blom, 2015	0.105	0.284
Gehrman, 2020	0.211	0.204
Chan, 2022	0.411	0.211
Savard, 2014/2016	0.440	0.159
Taylor, 2017	0.456	0.245
Franklin, 2018	0.515	0.527
Currie 2004	0.745	0.363
Kallestad, 2021	0.796	0.205
Bastien, 2004	0.930	0.381
Lancee, 2016	1.096	0.274
Pooled	0.317	0.106



Outcome : Total Sleep Disturbance

Early Drop out: 19.7% (e) vs. 13.7%
 Late Drop-out: 34.6% (e) vs. 28.5%
 Non significant difference.

Knutzen et al., JMIR, 2024

Meta-Analysis of Self-Help Apps vs. Control Conditions

Table 2. Meta-analysis comparing apps to control groups on primary outcomes.

Analysis	Insomnia symptoms				Sleep disturbances			
	k	g (95% CI)	I ²	NNT	k	g (95% CI)	I ²	NNT
Total effect	13	0.60 (0.44, 0.76)	63%	4.8	15	0.70 (0.58, 0.83)	48%	4.1

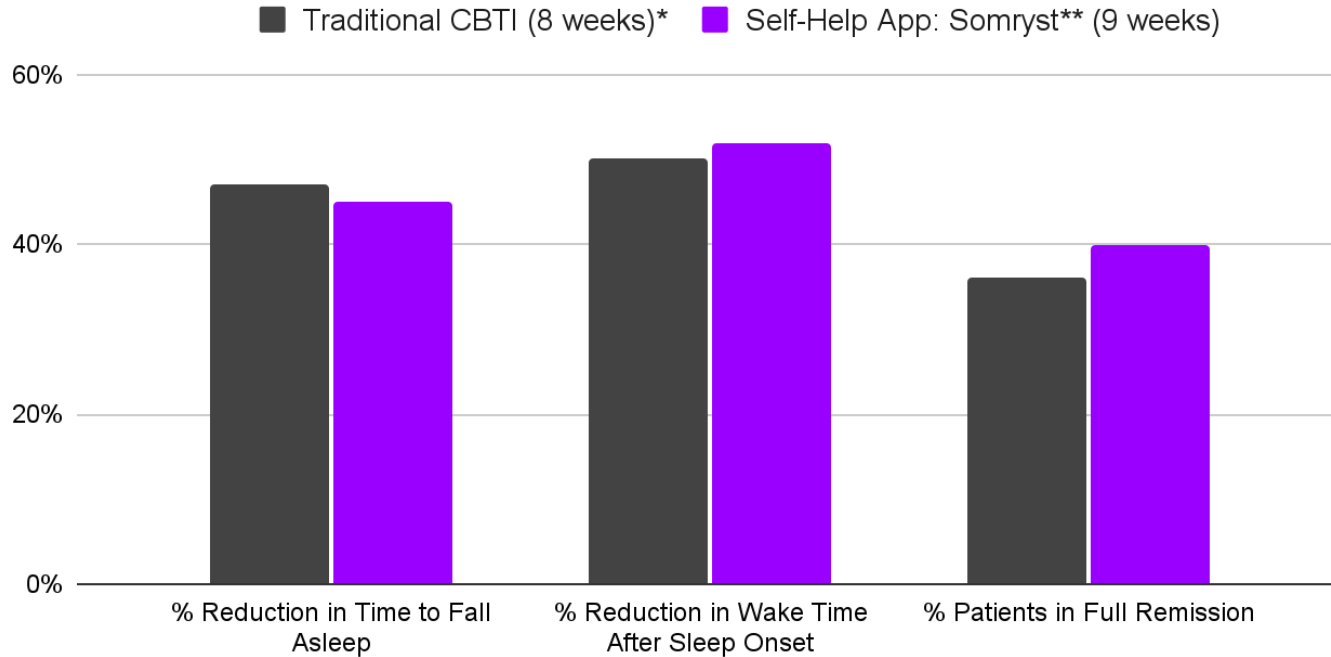
Linardon et al., Sleep Medicine, 2024

Tech-Only scalable solutions resolve the access problem!
Or does it?

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Self-help apps can yield comparable improvements to traditional CBTI.

Traditional CBTI (8 weeks) and Self-Help App: Somryst (9 weeks)

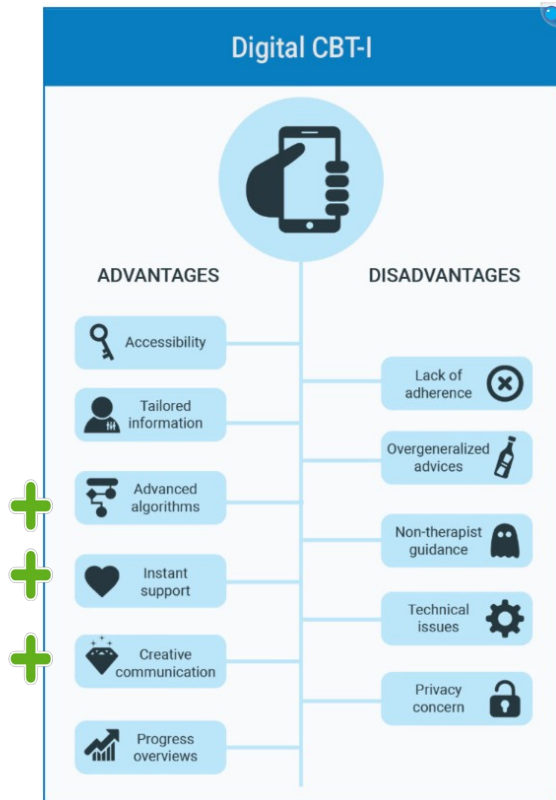


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*Wu et al., 2015

**Ritterband et al., 2022

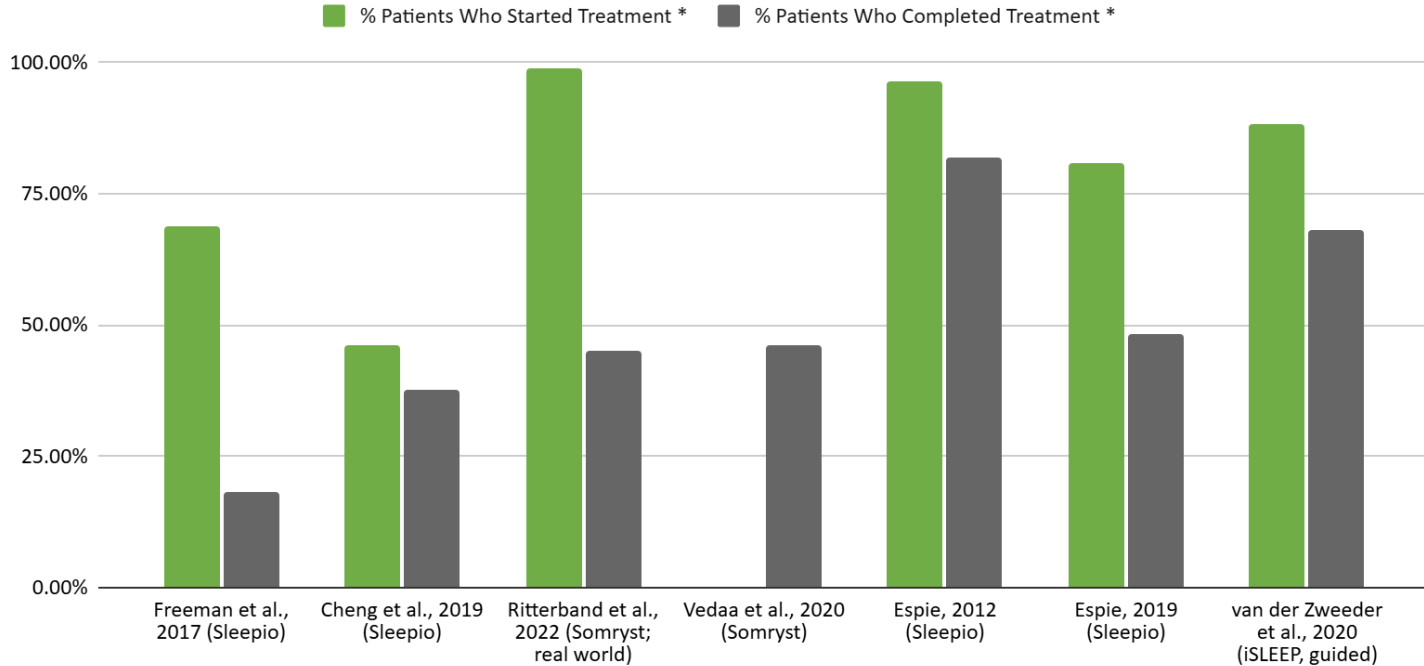
Benefits and Challenges of Tech Only Solutions:



- Potential for **increased reach and scalability**.
- **Access** is not equal to **exposure**.
- **Access and exposure are not equal to adoption or engagement**.
 - Patients' engagement is essential for (digital) behavioral interventions.
 - Completion optimizes clinical outcomes (?)

Erten Uyumaz, Feijs L, Hu J. Int J Environ Res Public Health. 2021

Engagement and Retention can be challenging (for whom?)



Self-Help Access is not equal to Adoption or Engagement.

JCSM | Journal of
Clinical Sleep Medicine

► J Clin Sleep Med. 2021 Aug 1;17(8):1675–1684. doi: [10.5664/jcsm.9280](https://doi.org/10.5664/jcsm.9280)

A population health approach to insomnia using internet-based cognitive behavioral therapy for insomnia

- **136,630 participants** randomized to internet-based CBTI vs. in-person group CBTI
 - Dx of insomnia or insomnia medication, or high-risk (depression, anxiety)
- **Engagement:**
 - Proportion of patients who accessed (redeemed code to sign in) ICBT-I: **0.96%**
 - Proportion of patients who attended at least one Sleep Well, Live Well session: **0.66%**
- **No difference** in medication dispensation or N of provider encounters over 12 months

In Person vs. digital vs. Other CBTI

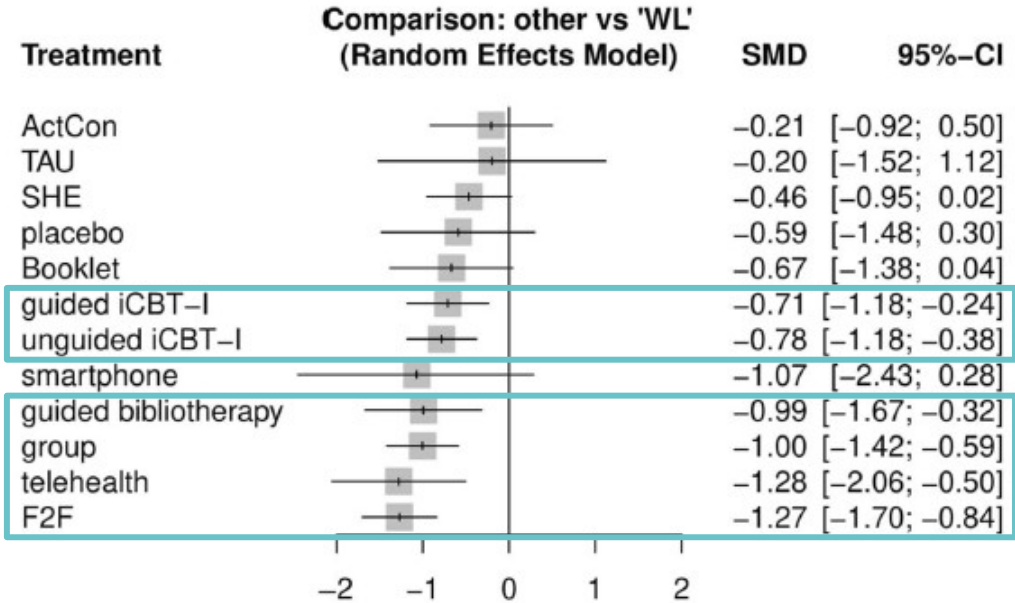
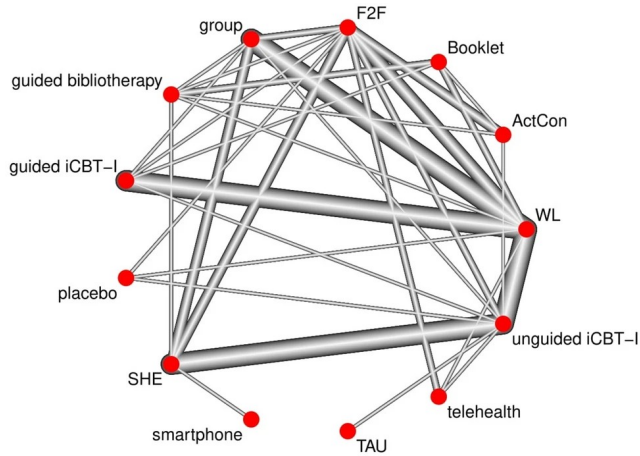
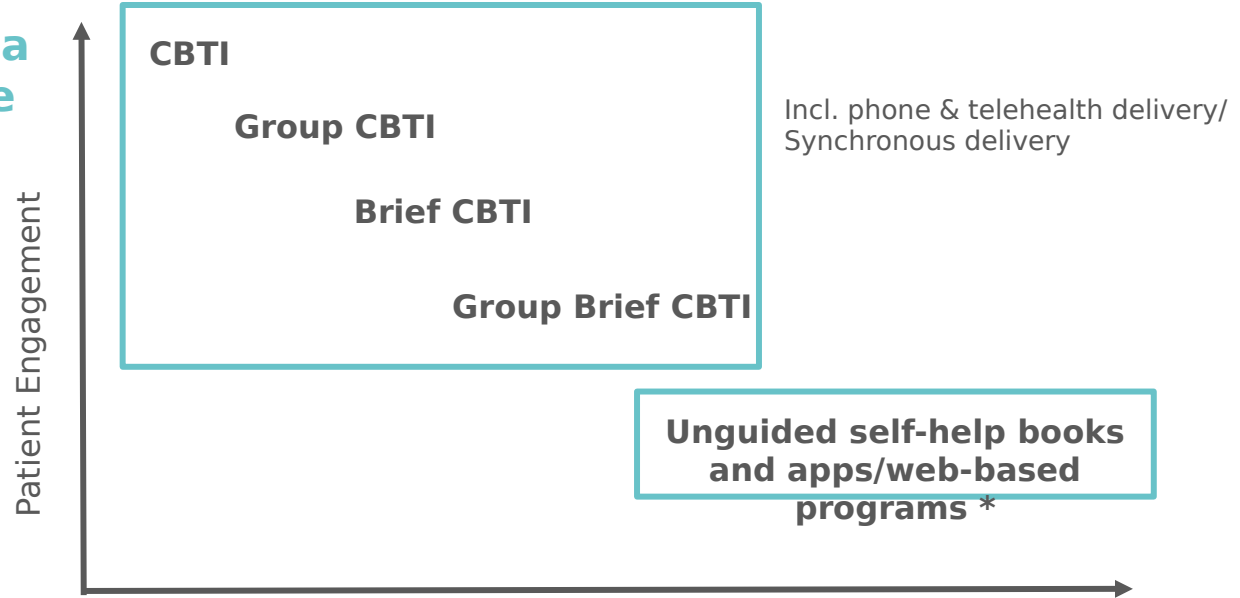


Figure 3. Forest plot insomnia severity. Treatments were ranked according to their P-Score.

Simon et al., Scientific Reports, 2023

“Steps” in Stepped Insomnia Care

**Best Insomnia
Care**



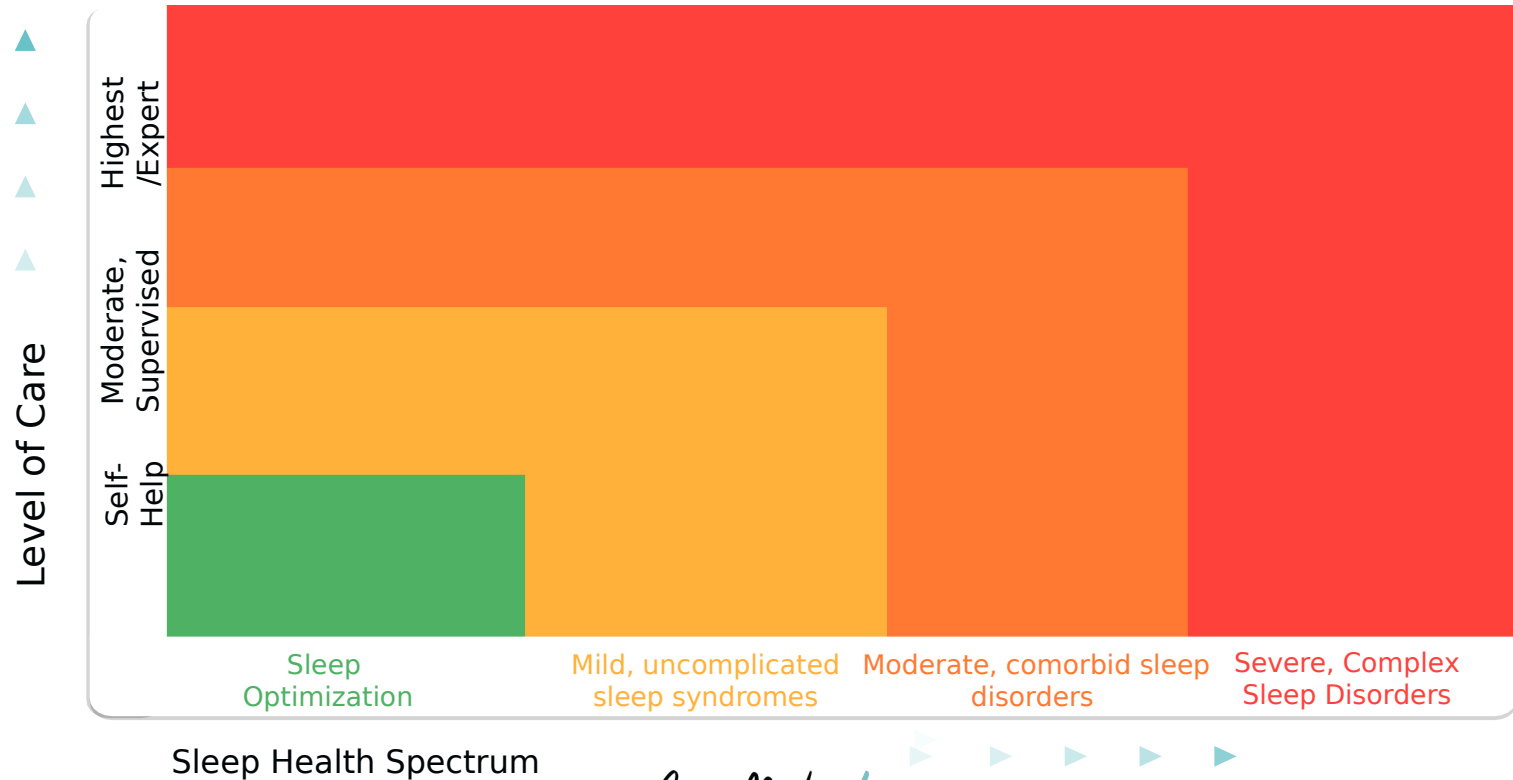
Steps Or Cliff?

Provider-Guided (Expert)



Self-Help / Tech Only

Insomnia is not a binary sleep disorder.



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Stepped Care?

A system of **delivering and monitoring** mental health **treatment** so that **the most effective**, yet **least resource intensive treatment**, is delivered **first**,

only “stepping up” to intensive / specialist services as required
and **depending on the level of patient distress or need**.

Bower & Gilbody, 2005

- ✓ **Readily accessible** form of treatment
- ✓ Provided at the **lowest cost** and
- ✓ **Least personal inconvenience** to patients and
- ✓ Requiring the **lowest** level of treatment **intensity***

Stepped Care for Insomnia 1.0

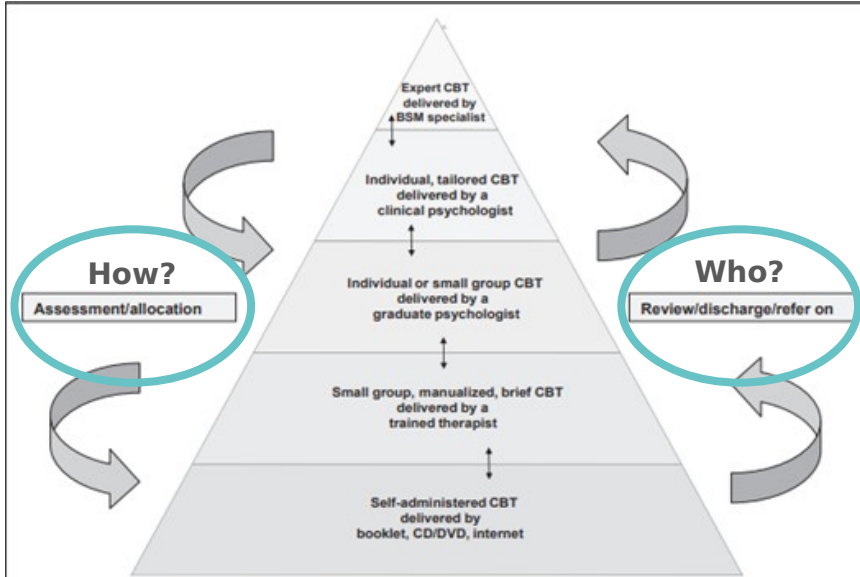


Figure 4—An evidence-based stepped care model for CBT (c. 2009) illustrating how patients might be allocated to resources in relation to assessed need, to achieve optimal service provision. Arrows represent self-correcting referral movements.

Patient w/ specialist

Patient w/ senior therapist

Patient w/ junior therapist

Small Guided Patient
Group

Self-Help Patient Alone

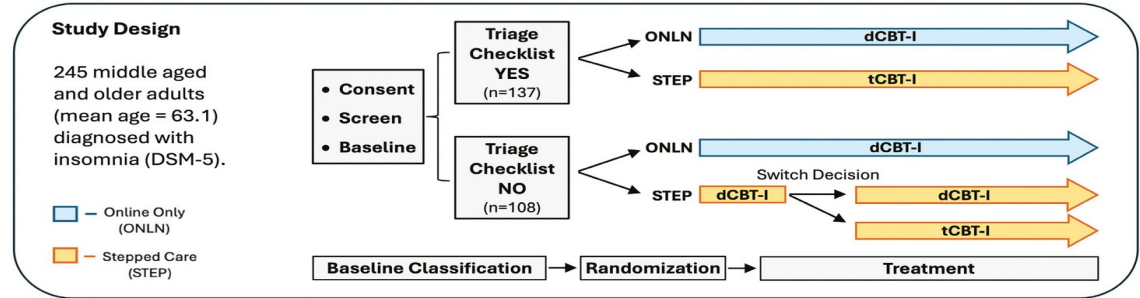
Espie, SLEEP 2009

Triaged Care for Insomnia (Manber et al, SLEEP, 2025)

Triage Checklist:

1. ≥ 4 nights of hypnotic use
2. Highly irregular sleep schedule
3. Psychopathology
4. TST < 4.5 hours
5. Sleep (ESS > 10)

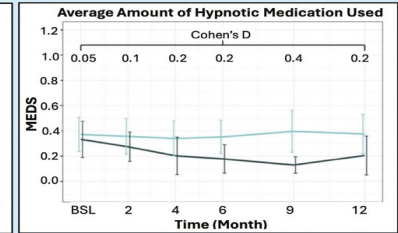
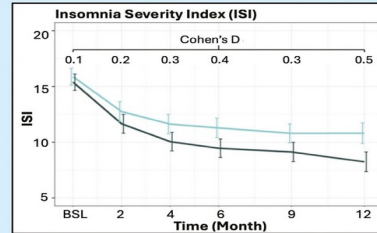
Efficacy of Triaged Stepped Care versus Online Only Strategies for Delivering CBT-I at Reducing Insomnia Severity and Hypnotic Medication Use



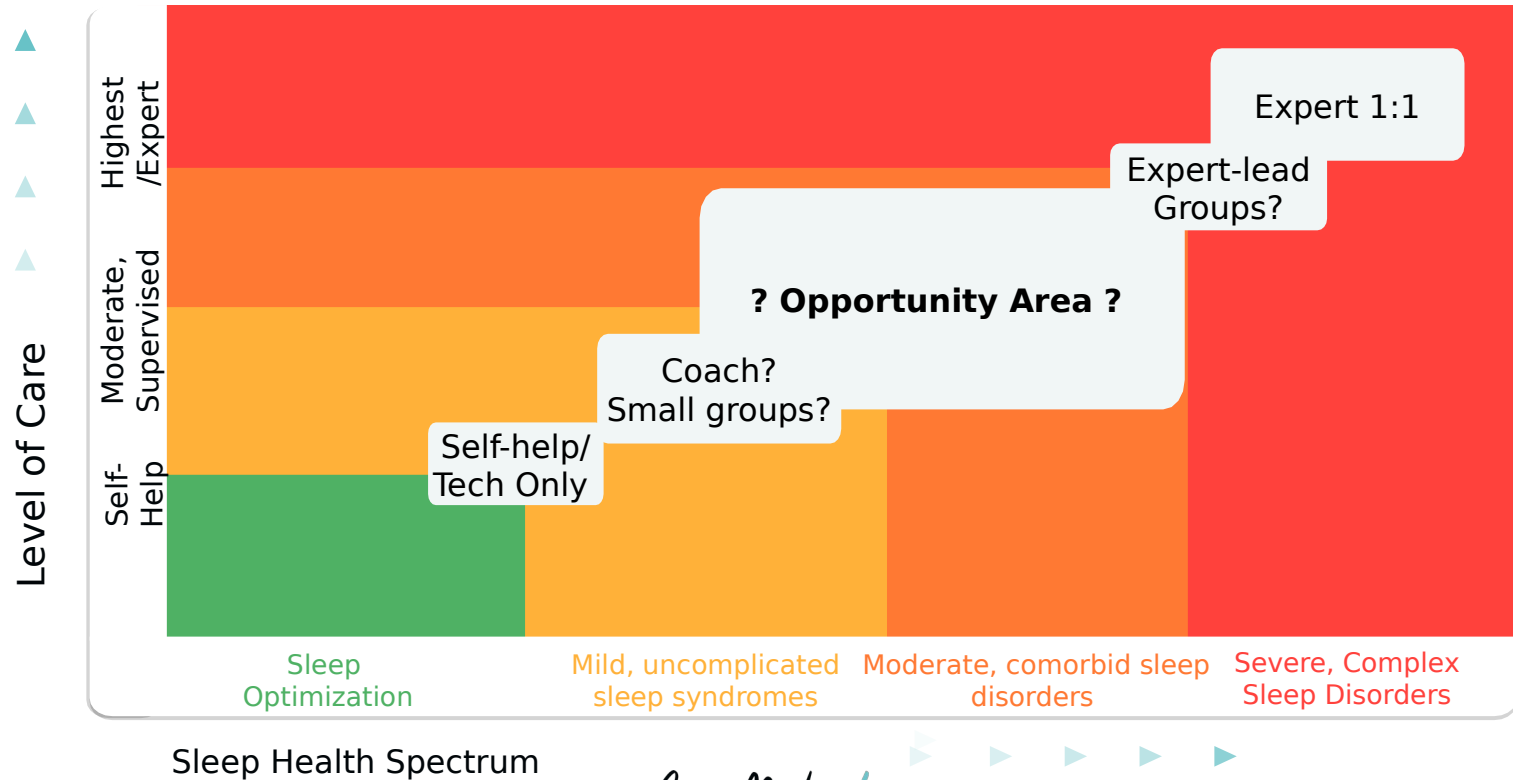
Efficacy of Stepped Care Strategy

Triaged STEP strategy is more effective than ONLN strategy for reducing ISI and medication dose.

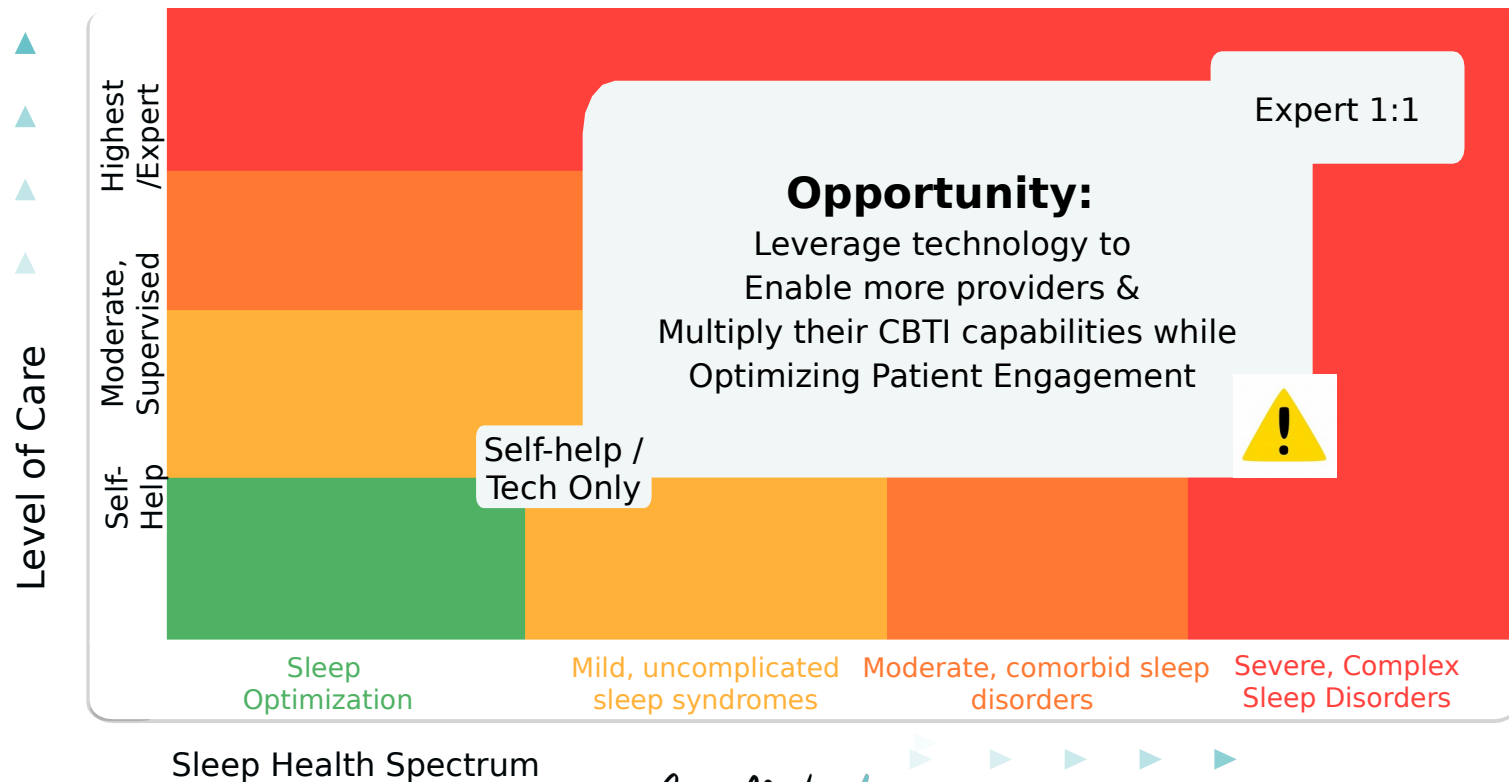
— ONLN — STEP



Matching Patients' Need, CBTI Intensity (considering costs)



Creating missing steps to bridge the cliff



Tech Enabled, Provided-Driven Solution



~~COAST~~®



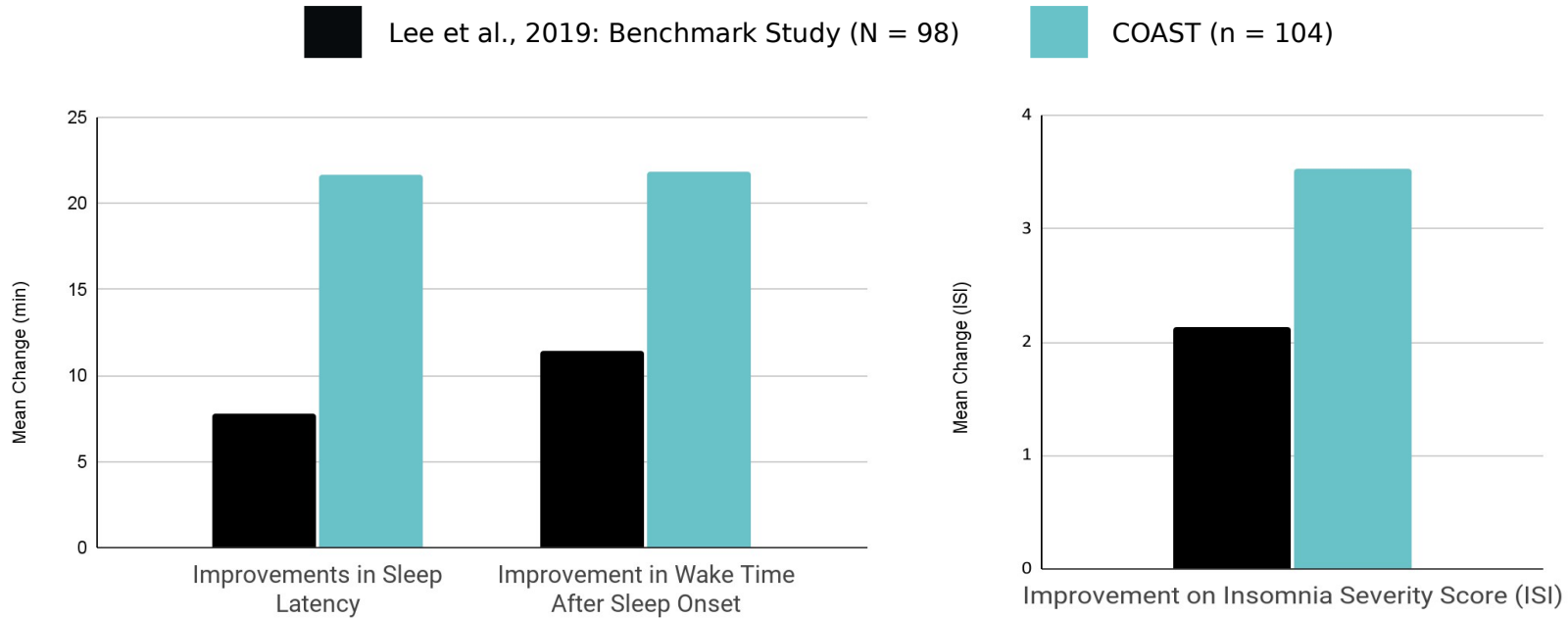
Clinical decision support platform designed to **upskill all providers**

- Optimized for patient engagement
- Built-in measurement based care*
- Tech automates complex workflows to achieve **provider-workflow fit**
- **Time saving** and multiplies of CBTI capabilities (10 min/week/patient).

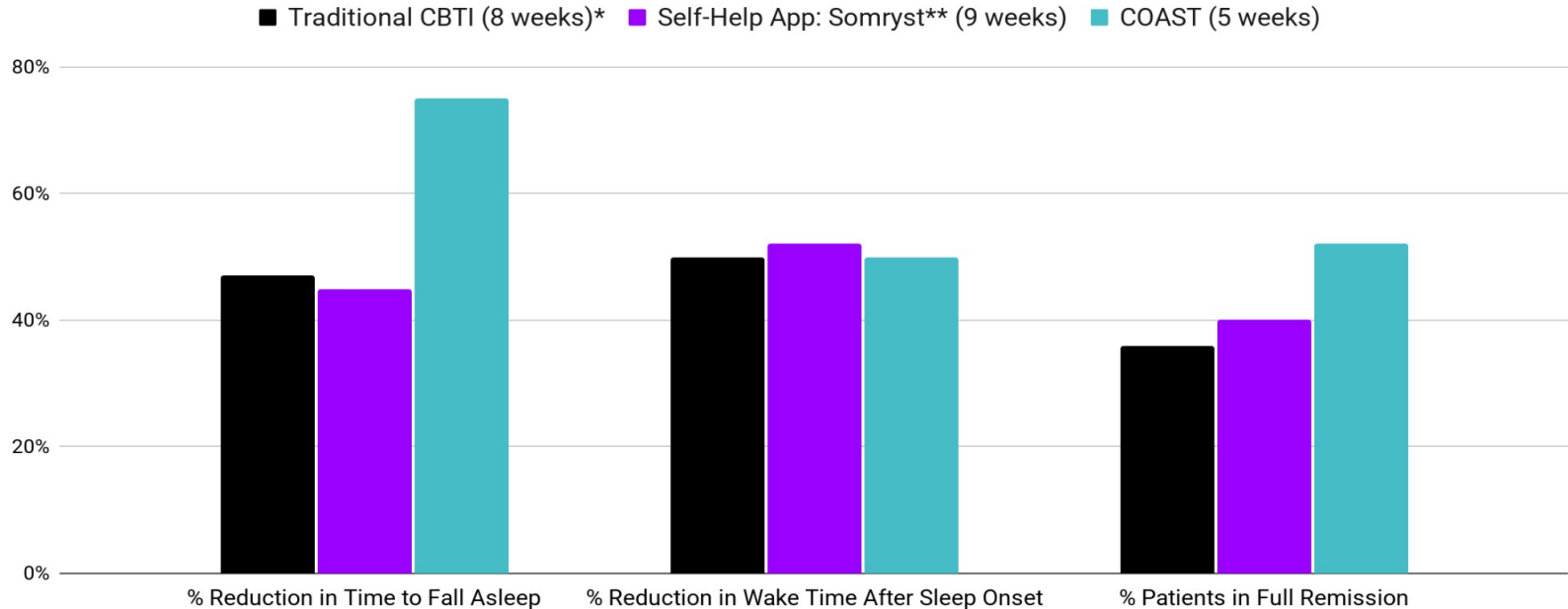
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Validation in military clinical settings:

Military personnel treated with COAST show similar improvements compared to those treated with traditional CBTI.



Providers using COAST see sleep improvements comparable to those seen with CBTI or self-help app.



Providers who use COAST see clinically meaningful improvements in patient sleep outcomes within 5 weeks (n=722).



82%
complete the program as
recommended by their
provider.
70%
response to treatment
after 5 weeks.
52%
remission of insomnia
after 5 weeks*.

75%
reduction in time to
fall asleep within 2
weeks.
50%
reduction in
nocturnal wake time
within 4 weeks.

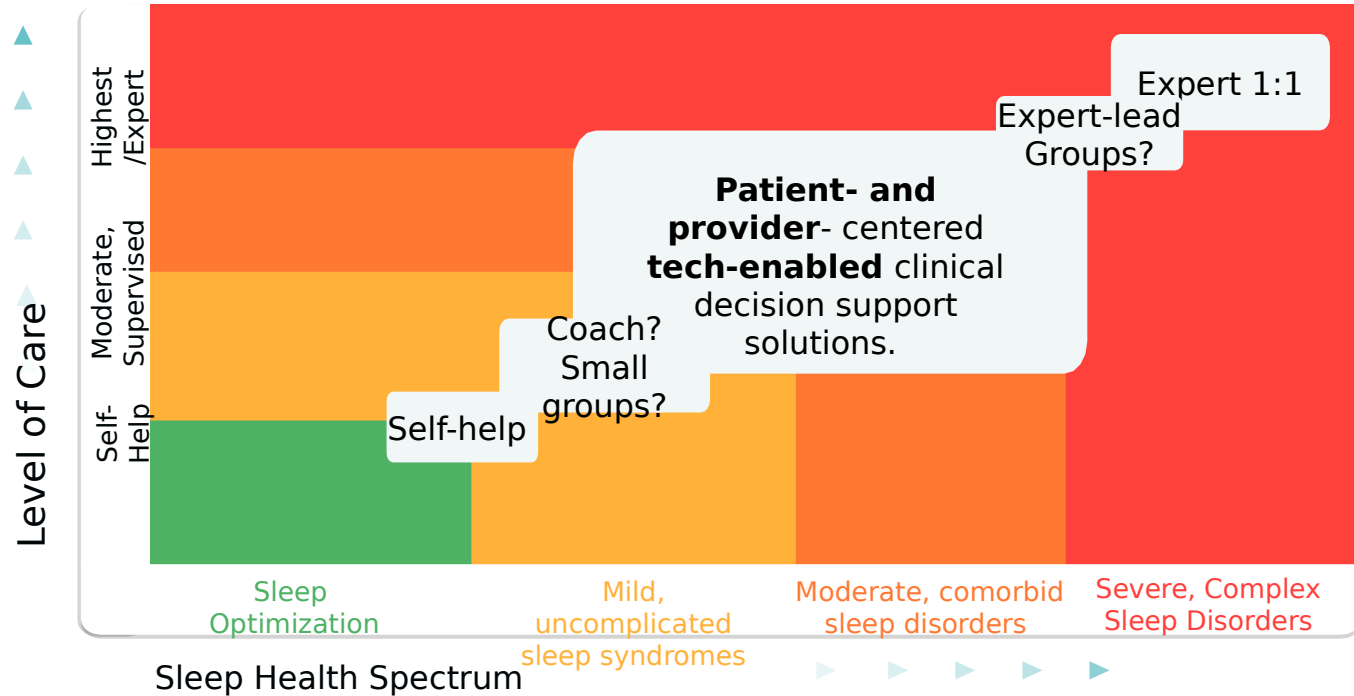
Germain et al., manuscripts in preparation.

*70% remission in 245 service members with insomnia in 5 weeks.

[Germain et al., SLEEP 2024](#)

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Beyond the Cliff: Stepped Insomnia Care 2.0



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Beyond the Cliff: Stepped Insomnia Care 2.0

- **Empower providers** with the right tools upstream
- **Driven by the severity** or complexity of insomnia (in addition to available resources)
- **Measurement-based care** to adapt “dosing”, escalate, or de-escalate as needed
- Leverage remote monitoring & management capabilities
- Leveraging tech: from “either/or” to **AND**
- Optimized for **patient engagement**
- **Cost efficient** and sustainable across clinical contexts



Conclusions

1. The insomnia problem is not going away.
 - Awareness raising efforts work, and patients are looking for solutions.
2. We have the tools necessary to **empower** healthcare providers, **upstream** of specialty CBTI/BSM practices.
 - CBTI (BSM) is inherently measurement-based care
 - Practice guidelines and safe, evidence-based techniques with rapid and sustained clinical gains.
3. We have solid **foundational evidence** to deploy a **tech-enabled steps** in insomnia to **scale the reach and accessibility, and multiply** capabilities of existing providers.

Conclusions

4. Untapped/under-tapped opportunities to develop and test predictive models that **work in real-world settings** to:
 - a. Match patient needs to delivery format
 - b. Optimize self-help / tech only solution uptake, retention, and clinical outcomes,
 - c. “Rescue” patients who disengage or show mitigated engagement at each step
 - d. Standardize the personalization of insomnia care
5. Create the **right incentives** to facilitate and sustain **adoption** of possible CBTI delivery options.



Thank you!

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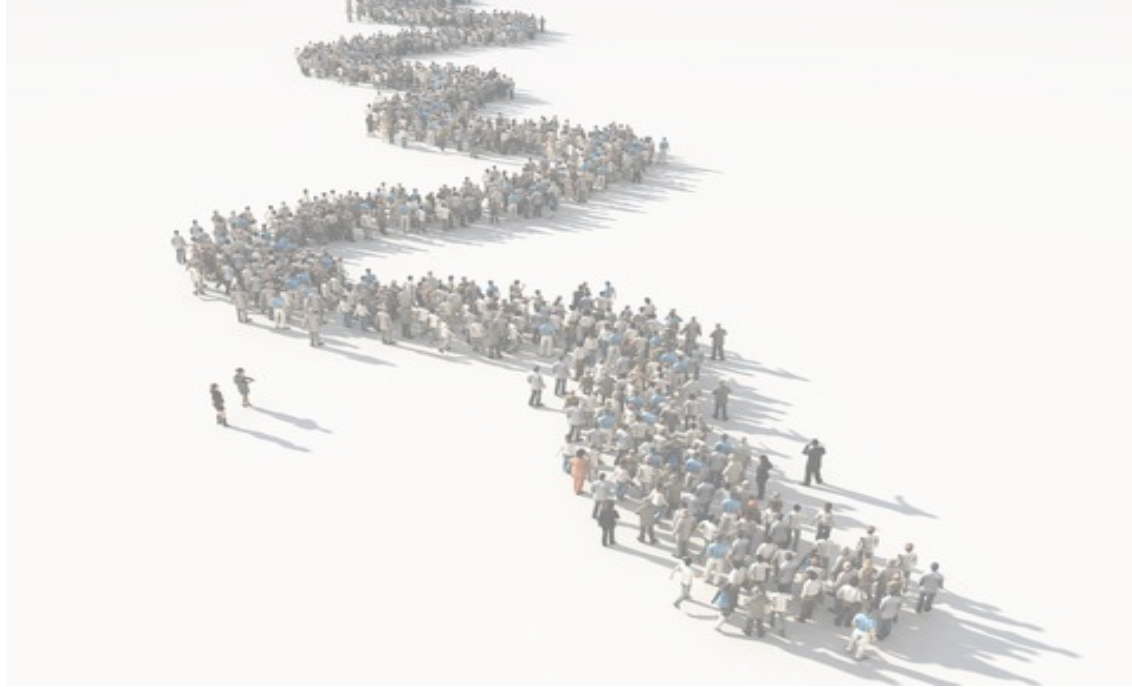
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HEALTH

The Insomnia Problem



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Quality and content for self help app = > same for providers!

Smartphone Applications to Support Sleep Self-Management: Review and Evaluation

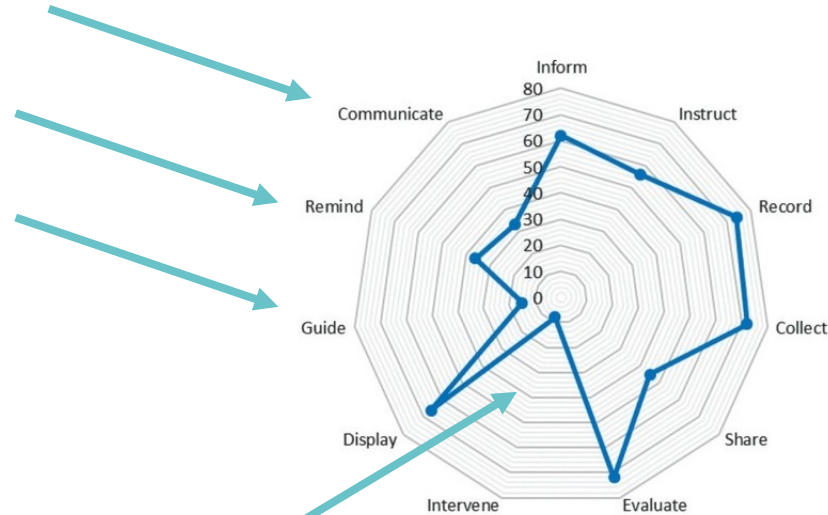


Figure 2: Functionality of included apps based on IMS Institute for Healthcare Informatics functionality scores.

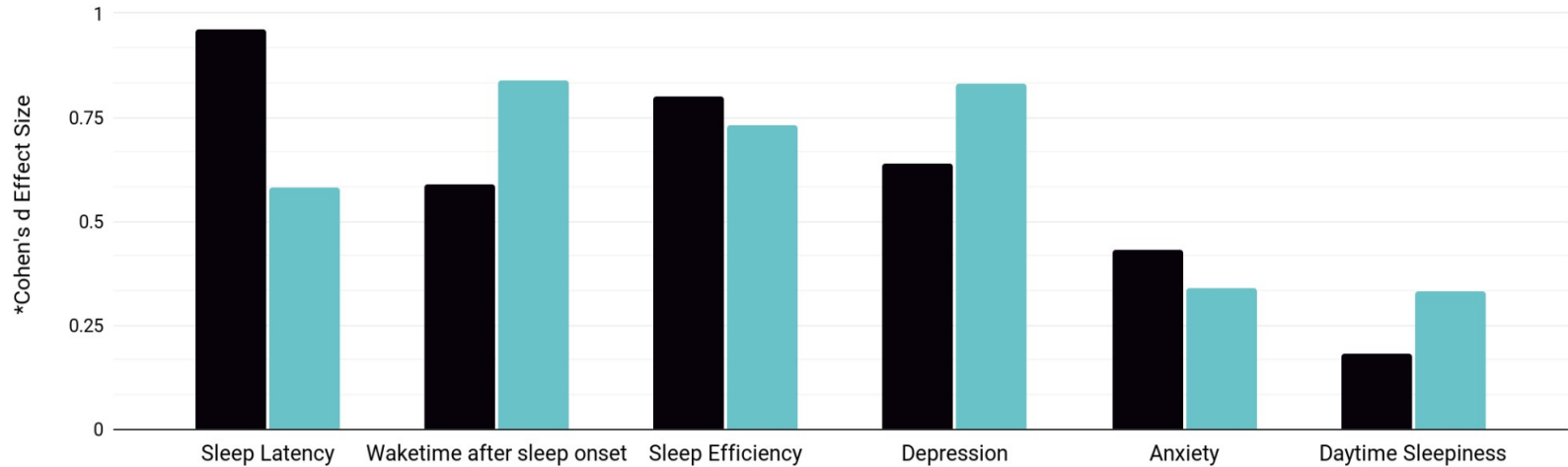
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Older adults use COAST successfully.

Older adults treated with COAST show **improvements in insomnia and daytime well-being** comparable to those reported with in-person therapy.

COAST vs. In-Person Behavioral Therapy for Insomnia in Older Adults

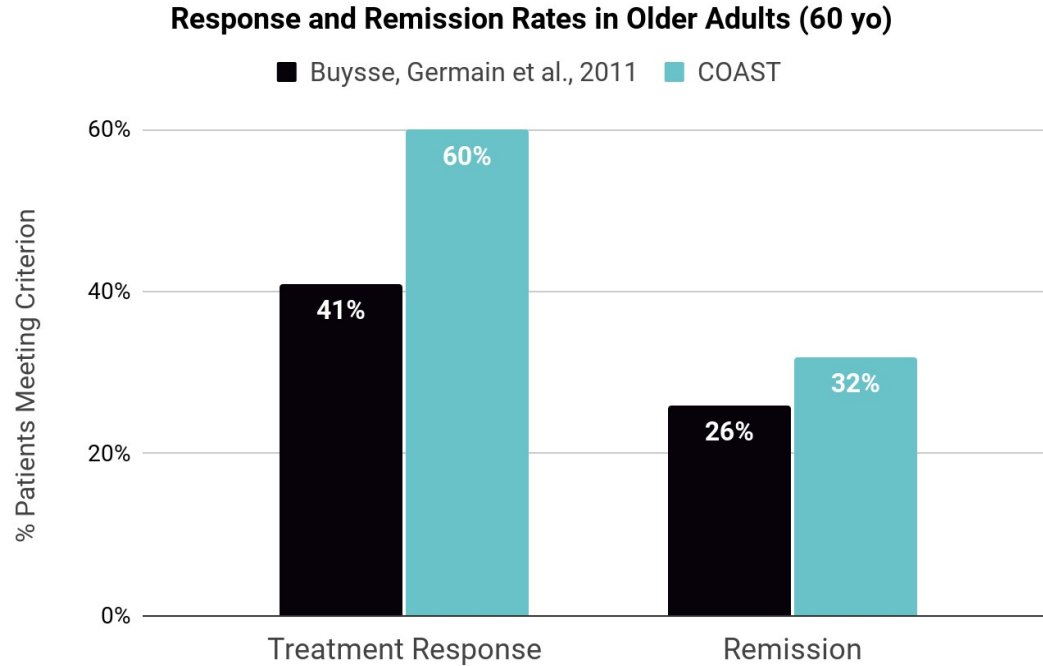
■ Buysse, Germain et al. (2011): In-Person Brief Therapy for Insomnia (n = 39) ■ COAST (n = 39)



*Cohen's *d* effect size: 0.2-0.5: Small | 0.5-0.8: Medium | > 0.8: Large

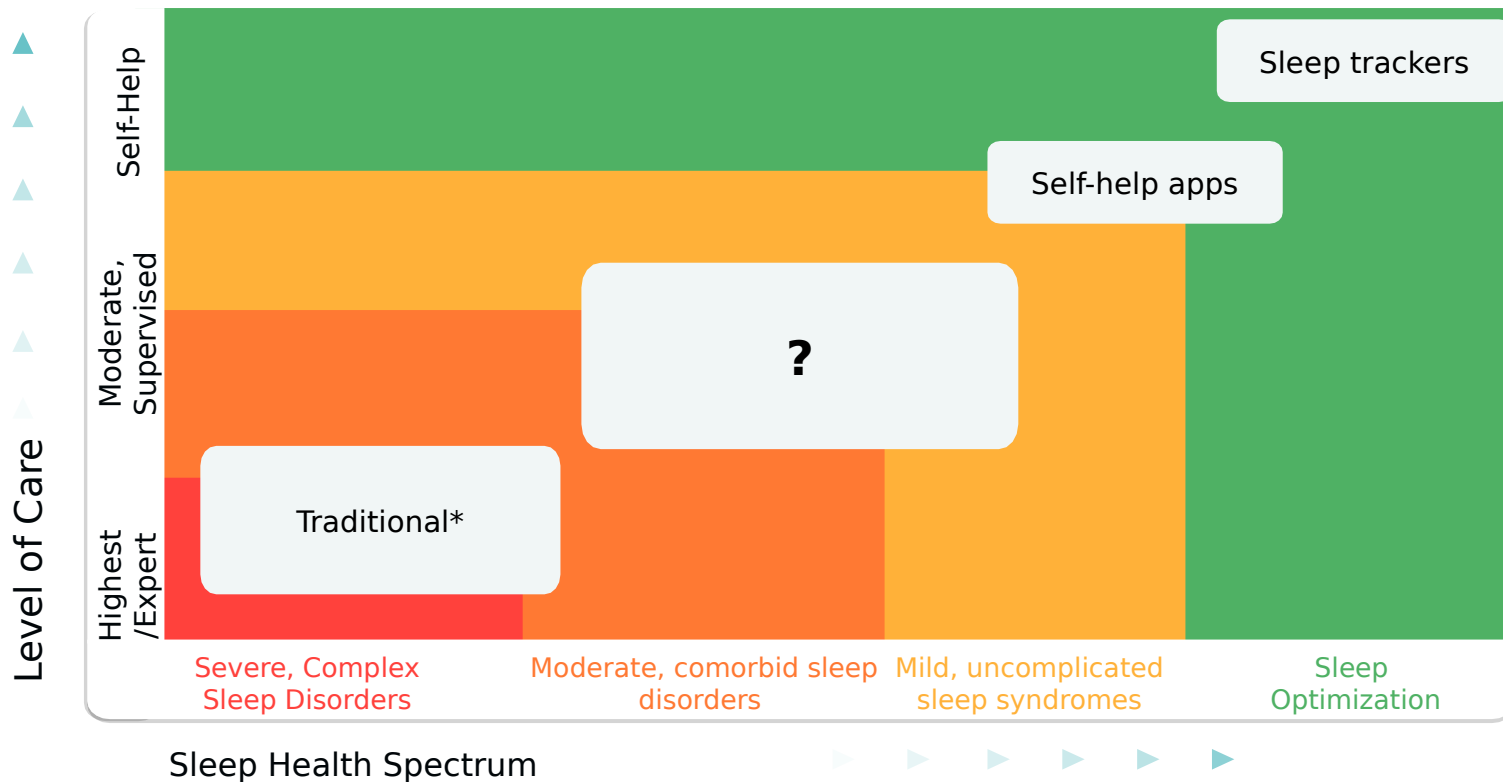
COAST & older adults.

Older adults treated with COAST show comparable* rates of treatment response and full remission compared to in-person therapy (BBTI).



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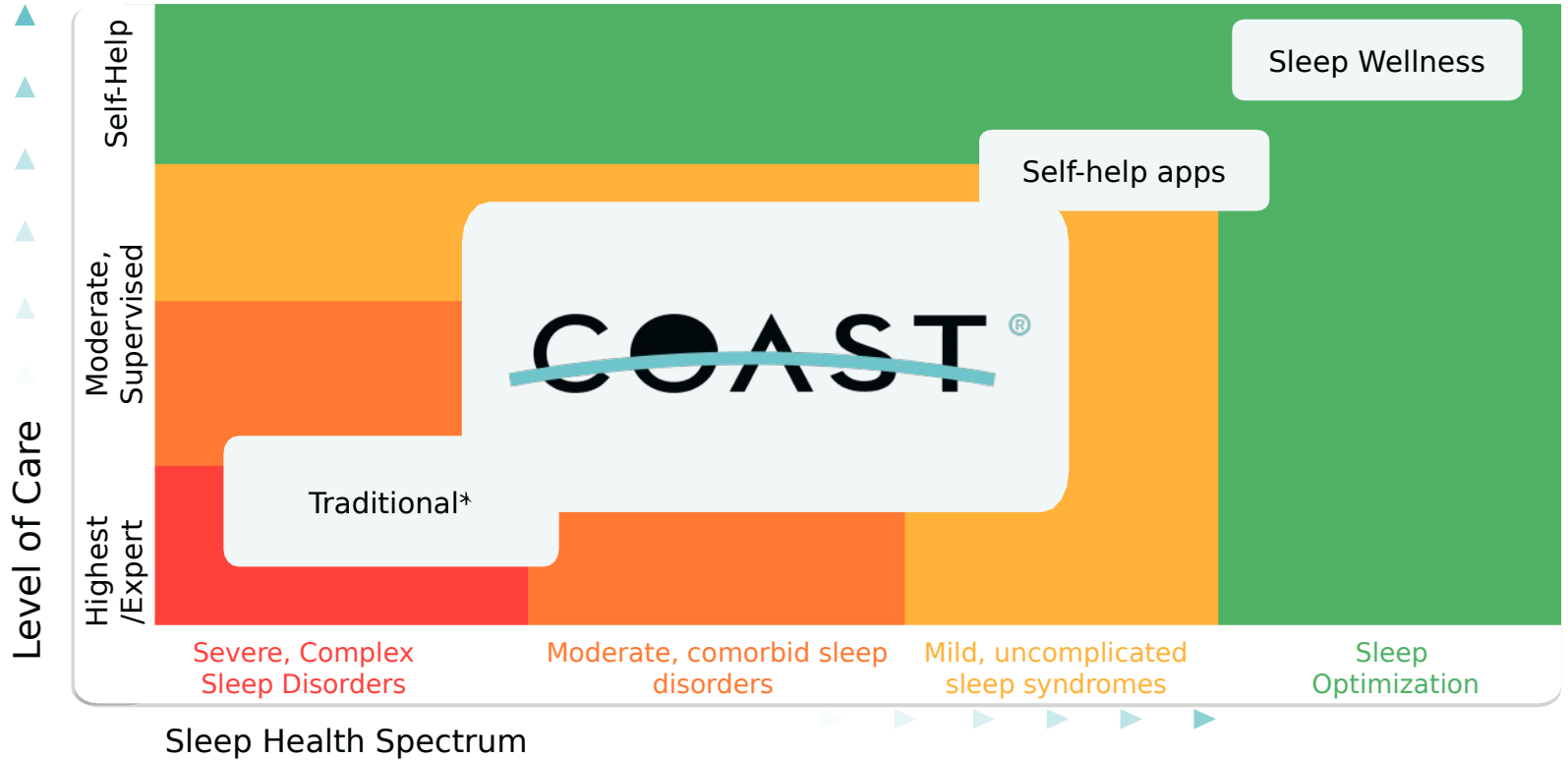
Precision Behavioral Sleep Medicine : Matching Needs and Evidence-Based Solutions



Sleep Health Spectrum

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Adding a Step to Stepped Care in BSM



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