

ACT



CBT-i



National Center for
PTSD

POSTTRAUMATIC STRESS DISORDER

CPT



The VA National Center for PTSD Mobile Mental Health Program: Developing, Researching, and Disseminating Mobile Apps for Mental Health



PE



Eric Kuhn, PhD

Dissemination and Training Division

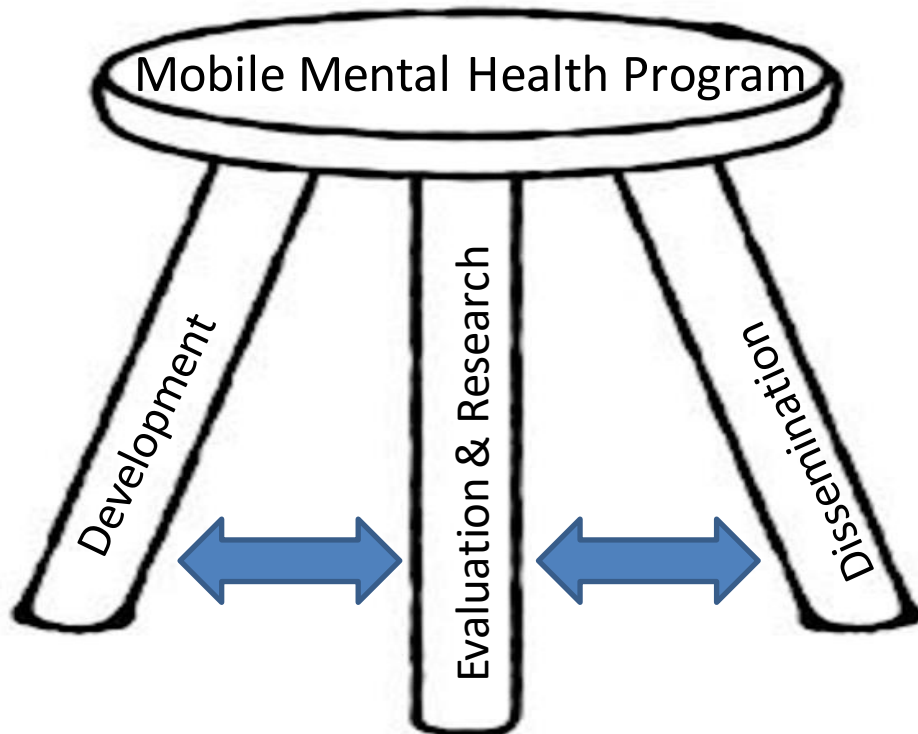
VA National Center for PTSD

Department of Psychiatry and Behavioral Sciences

Stanford University School of Medicine

- The contents of this presentation do not necessarily represent the views of the U.S. Department of Veterans Affairs or the United States Government.





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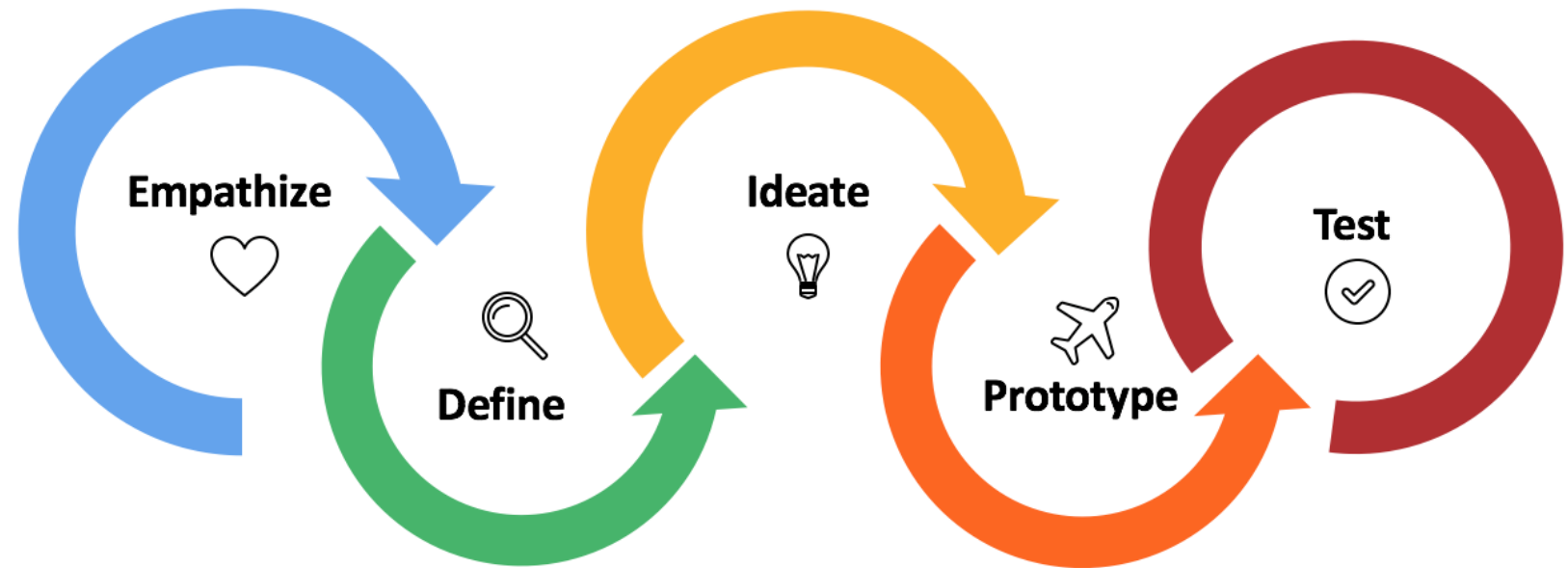
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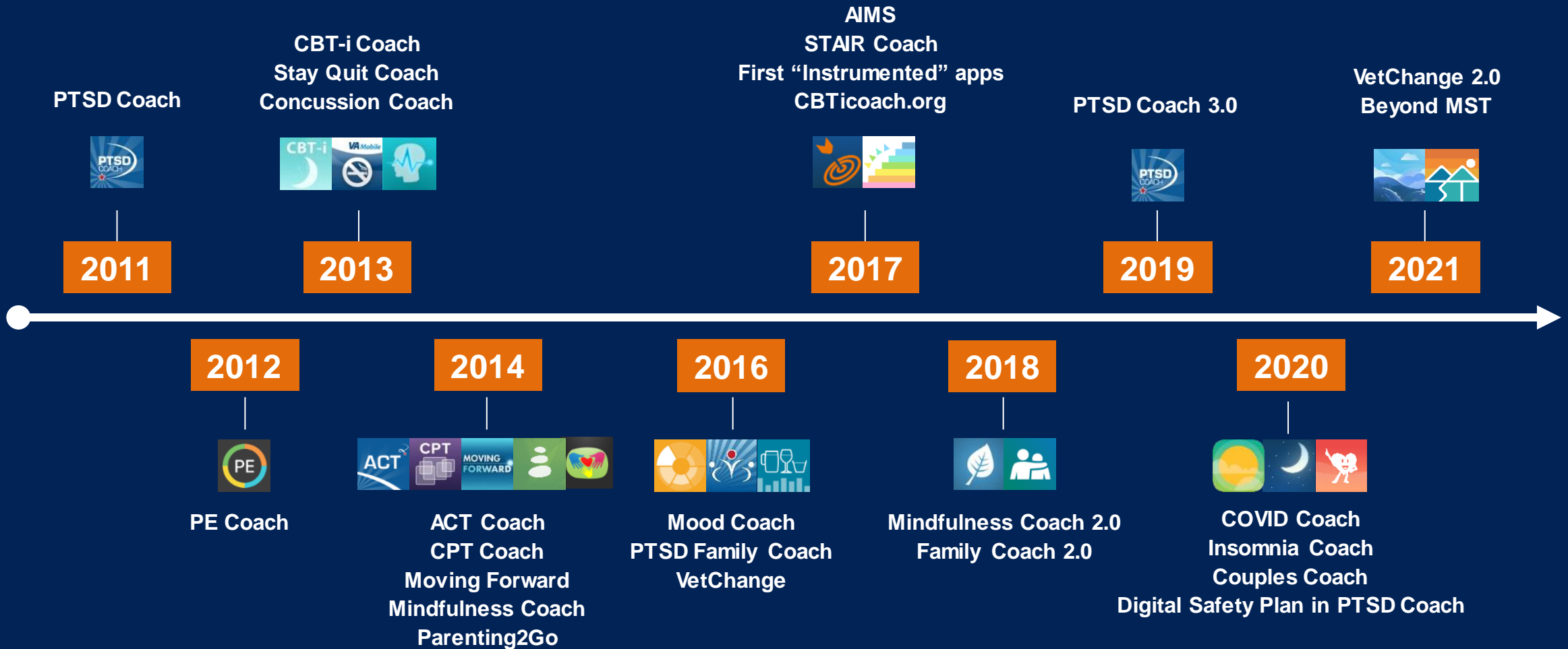


Developing Apps

A SUITE OF MOBILE APPS FOR SELF-MANAGEMENT AND TREATMENT SUPPORT



VA NCPTSD Mobile Mental Health Apps



Our Process for Developing a Mobile App



	SMEs: Expert content contributors	Mobile Apps Team: Product management, content development, UI	Development Team: Programming and design
Phase I: Scope & Structure	Propose features Review and provide feedback on wireframes Write content	Assemble team Coordinate meetings Obtain feedback from key stakeholders, target population on wireframe, UX Final approval on wireframes Write and edit content	Generate and edit wireframes Suggest UI edits
Phase 2	Write and edit content Suggest images, test early builds Submit GitHub issues Complete/finalize content documents Send final feedback on functionalities <u>Test early builds</u>	Edit and maintain content documents Obtain feedback from key stakeholders, target population on app name, icon and design Final approval on app name and icon Set up testing schedule for testing team GitHub training and repository set up <u>App design testing</u>	Design app icon Program content and features Address GitHub issues Manage UI testing team <u>Dev team testing</u> <u>UI team testing</u>
Phase 3		Confirm final functionalities with SMEs and dev team Weekly GitHub repository review Email team members issue reminders <u>Functionality testing</u>	Address GitHub issues Suggest and design functionalities <u>Dev team testing</u>
Phase 4		Functionalities complete Content document testing Complete image selection Weekly GitHub repository review Email team members issue reminders	Address GitHub issues Suggest UI edits <u>Dev team testing</u> <u>UI team testing</u>
Phase 5		Triage issues with future update Typical user testing Beta testing pool management and GitHub facilitation	Address GitHub issues



NCPTSD Mobile Mental Health Apps

Self-Care Apps



Treatment Companion Apps



Promise of Self-Care Apps

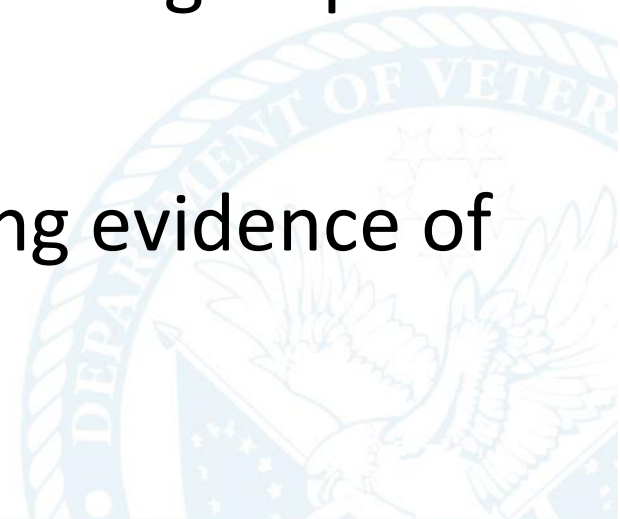
Expand access to MH services (highlighted during the pandemic)

85% of U.S. adults own smartphones (Pew, 2021)

May reach minority populations who experience healthcare disparities (López et al., 2012; USDHHS, 2001)

Smartphone ownership similar across ethnic/racial groups (Pew, 2021)

Self-help internet-based interventions (IBIs) have strong evidence of efficacy for many MH conditions (Mohr et al., 2021)



Self-Care Mobile Apps



PTSD Coach supports the self-management of posttraumatic stress disorder (PTSD).



PTSD Family Coach is for partners, family members, and other loved ones of individuals who may be experiencing PTSD.



AIMS for Anger Management (Anger and Irritability Management Skills) is an app for anyone experiencing problematic anger.



Beyond MST is for managing stress that may be related to the experience of military sexual trauma



Couples Coach is for partners who want to improve their relationship and explore new ways to connect.



COVID Coach is for managing stress related to the COVID-19 pandemic.



Insomnia Coach is designed for anyone who would like to improve their sleep.



Mindfulness Coach is designed to help people regularly practice mindfulness.



VetChange is an app for anyone who is concerned about their drinking and PTSD.



Example: PTSD Coach



Ratings and Reviews

4.7 out of 5

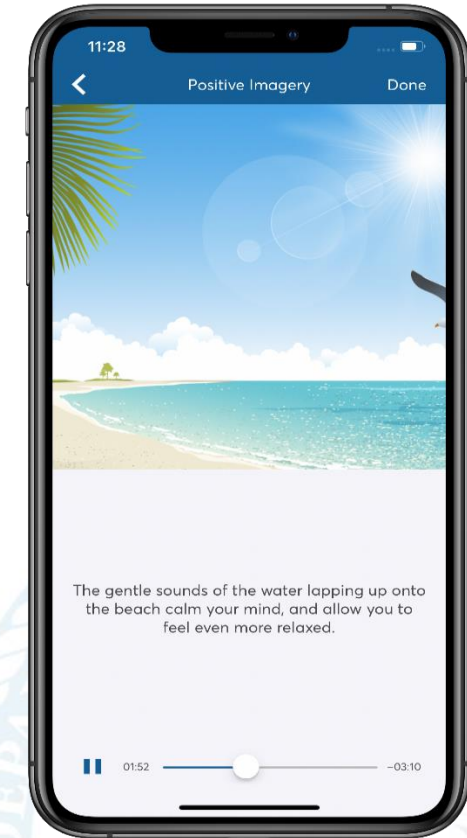
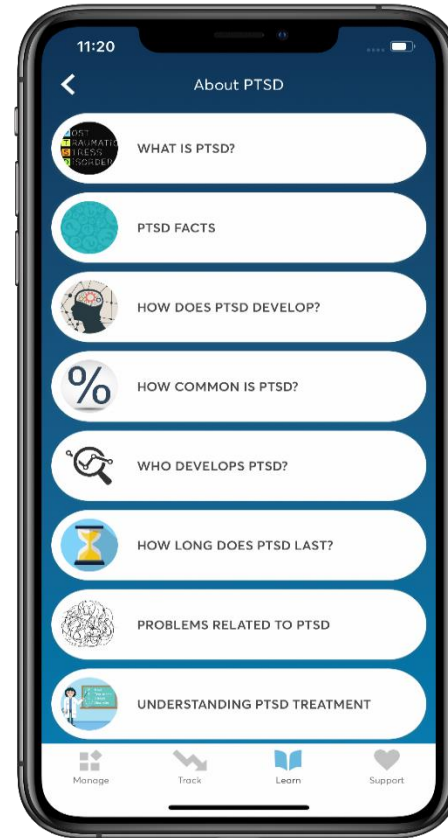
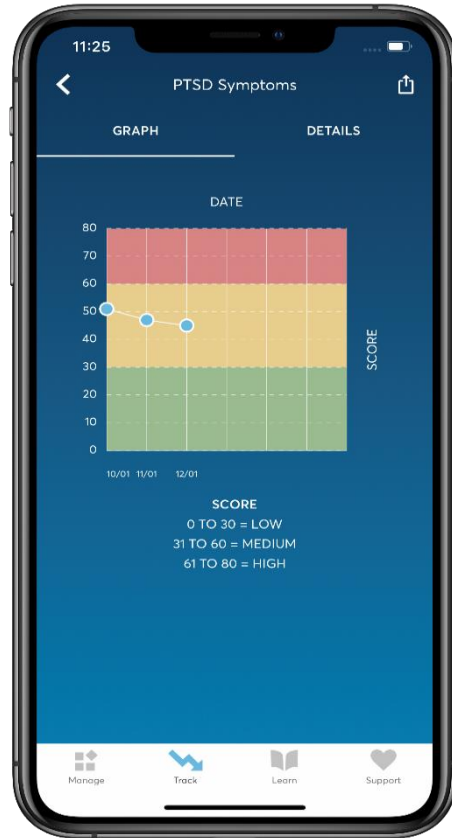
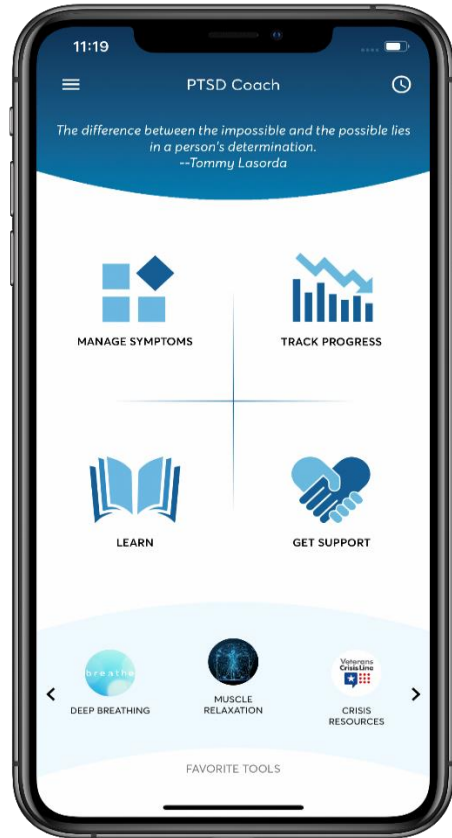
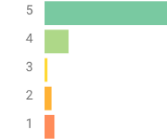
1.2K Ratings



Reviews

Review policy and info

4.5
★★★★★
909 total



- Amount of improvement
 - Treatment vs. treatment plus mTech ES = .27 (Lindheim et al., 2015)
- Speed of improvement
 - Fewer sessions (e.g., Jones et al., 2013 - for parent training)
 - Could lead to lower dropout
- Breadth of improvement
 - Could include additional tx targets (e.g., insomnia, smoking)
- Maintenance of improvement
 - Relapse prevention
 - Continued improvement (skills generalization)



Treatment Companion Apps



ACT Coach supports Acceptance and Commitment Therapy (ACT).



PE Coach supports Prolonged Exposure (PE) therapy.



CBT-i Coach supports Cognitive Behavioral Therapy for Insomnia (CBT-I).



STAIR Coach supports Skills Training in Affective & Interpersonal Regulation (STAIR). ★



CPT Coach supports Cognitive Processing Therapy (CPT). ★

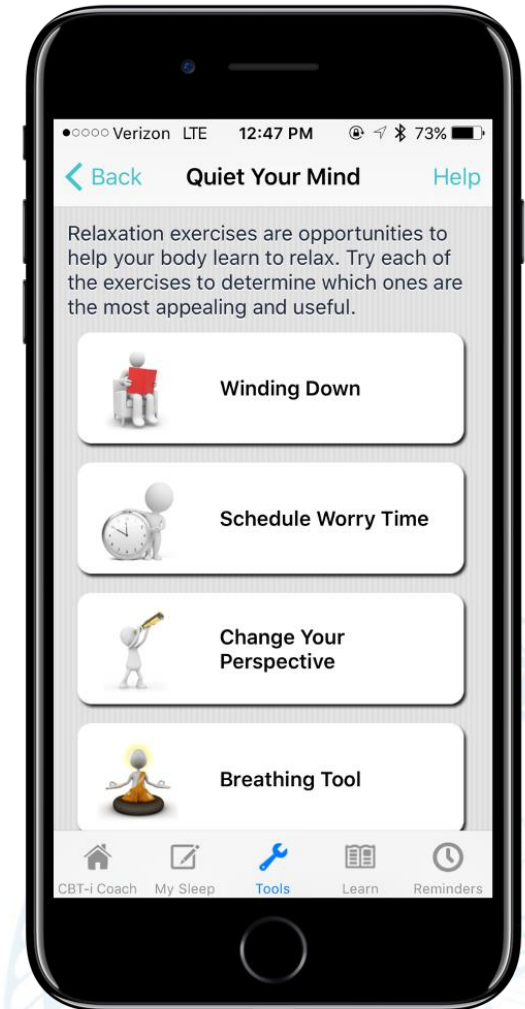
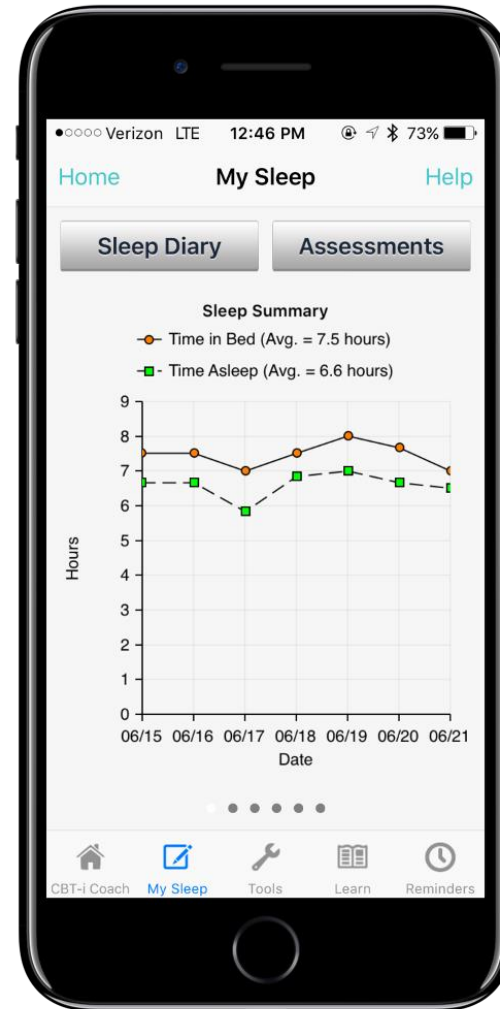
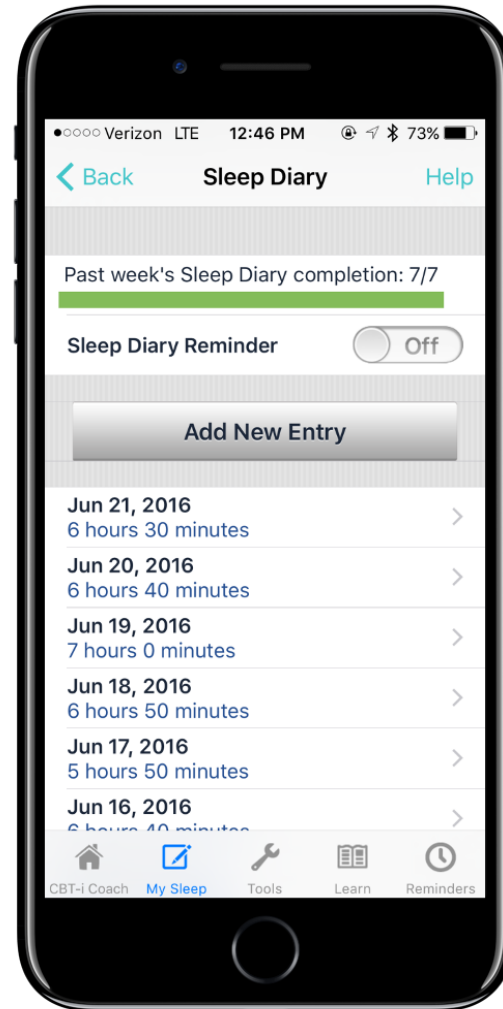
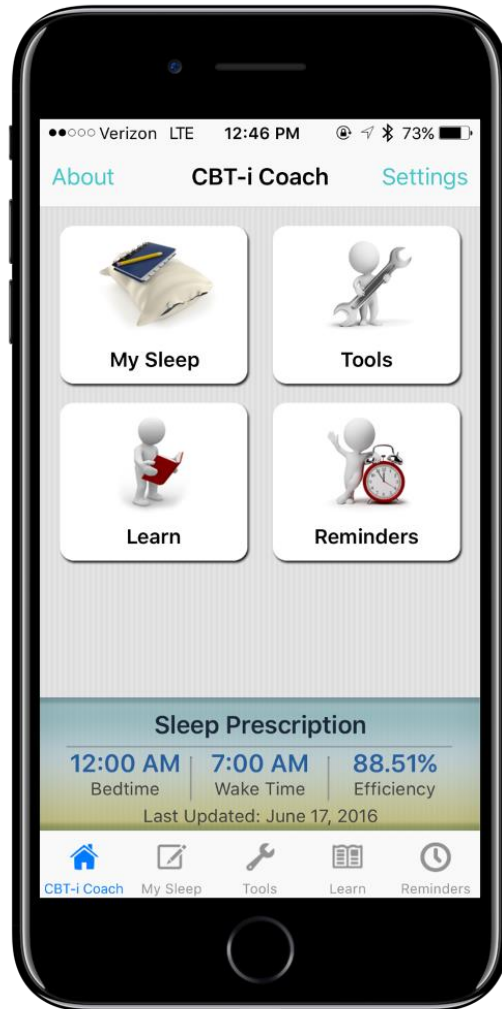


Stay Quit Coach supports Smoking Cessation Therapy.

★ App is currently undergoing a redesign



Example: CBT-I Coach



Emerging Direction: Provider Dashboards



PLATFORM

RELEASE

DATE

STUDY

INVITE CODE

SESSION

INVESTIGATOR

USER



5M sessions
50 sessions/user



36k days app usage
36 days/user



10B events
100k events per user



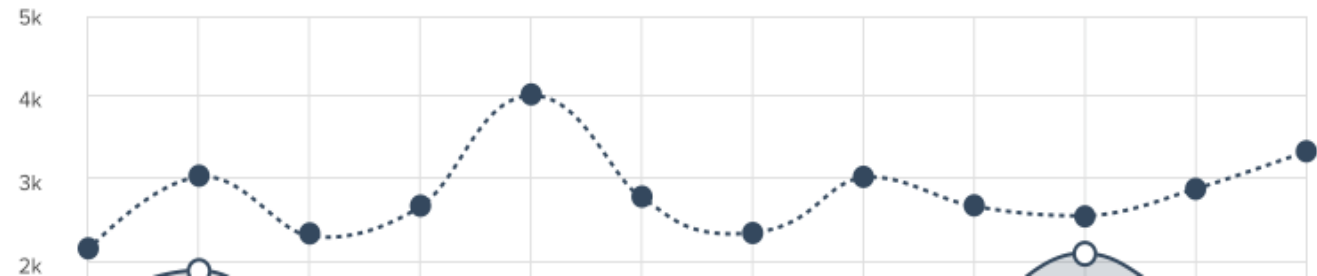
12 weeks
avg time between last and first use

Users



Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.

● Users



CBT-I Coach Dashboard



CBT-i Coach Dashboard

[Admin](#) [My Patients](#) [Help](#) [Logout](#)

ISI

Graphs (Sleep Diaries)

Data (Sleep Diaries)

Help

Sleep Diary Graphs for

cew0bb

Excel Sleep Diary Data

Data For Progress Note

View

Starting Midnight 12 AM

Ending 11:59:59 PM

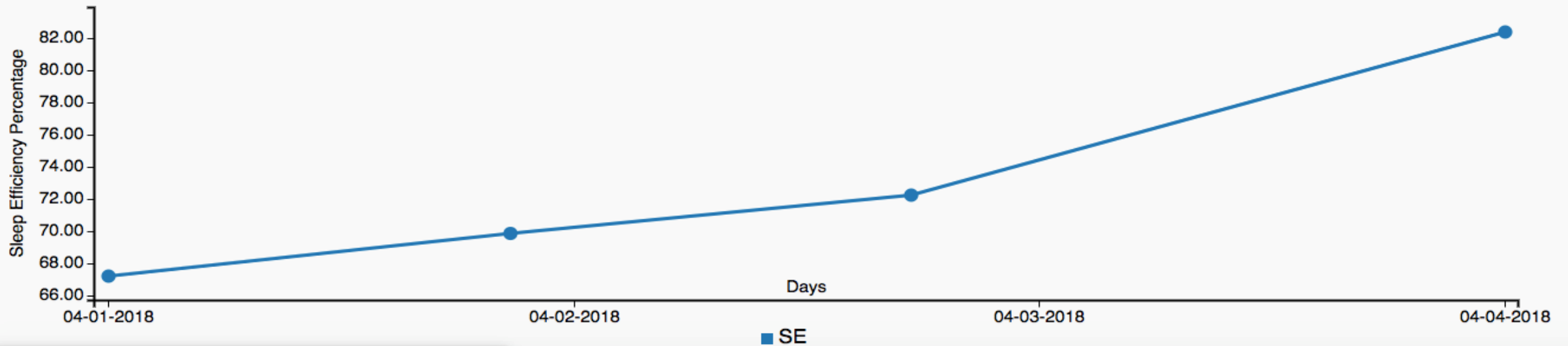
Daily

04/01/2018

04/04/2018

Apply

Sleep Efficiency %



<https://cbtcoach.org/cbti/cew0bb/sdexceldump>

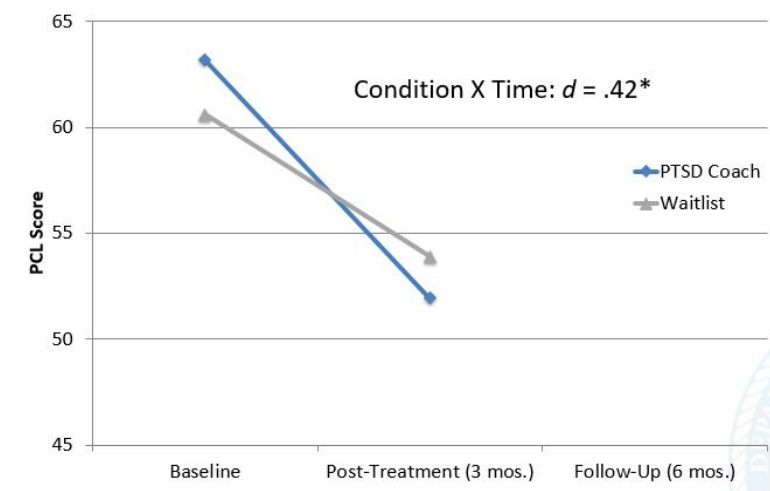


NCPTSD Apps are...

- Free & publicly available in the app marketplaces
 - www.ptsd.va.gov/appvid/mobile
- Secure: do not share or require personal information
- Fully Section 508 compliant
- Evidence-informed
- Fully functional without Internet connection
- Tailored to Veterans & VA providers but can be used by anyone



PTSD Symptom Improvement



Research

DO VA NCPTSD APPS IMPROVE OUTCOMES?

Feasibility, Acceptability, and Potential Efficacy of the PTSD Coach App: A Pilot Randomized Controlled Trial With Community Trauma Survivors

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Palo Alto University and Stanford University School
of Medicine

Eric Kuhn

Veterans Affairs Palo Alto Health Care System, Palo Alto,
California, and Stanford University School of Medicine

Julia E. Hoffman and Jason E. Owen

Veterans Affairs Palo Alto Health Care System,
Palo Alto, California

Josef I. Ruzek

Veterans Affairs Palo Alto Health Care System, Palo Alto,
California, and Stanford University School of Medicine

C. Barr Taylor

Stanford University School of Medicine

Funding: VHA Clinic-in-Hand Initiative (PIs: Ruzek, Kuhn, & Hoffman)

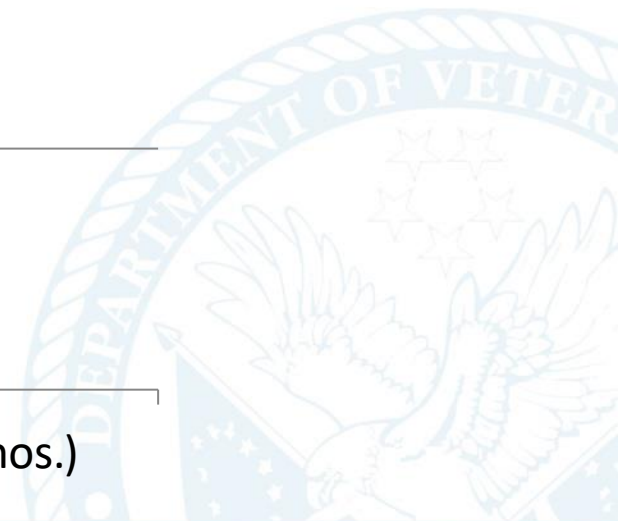
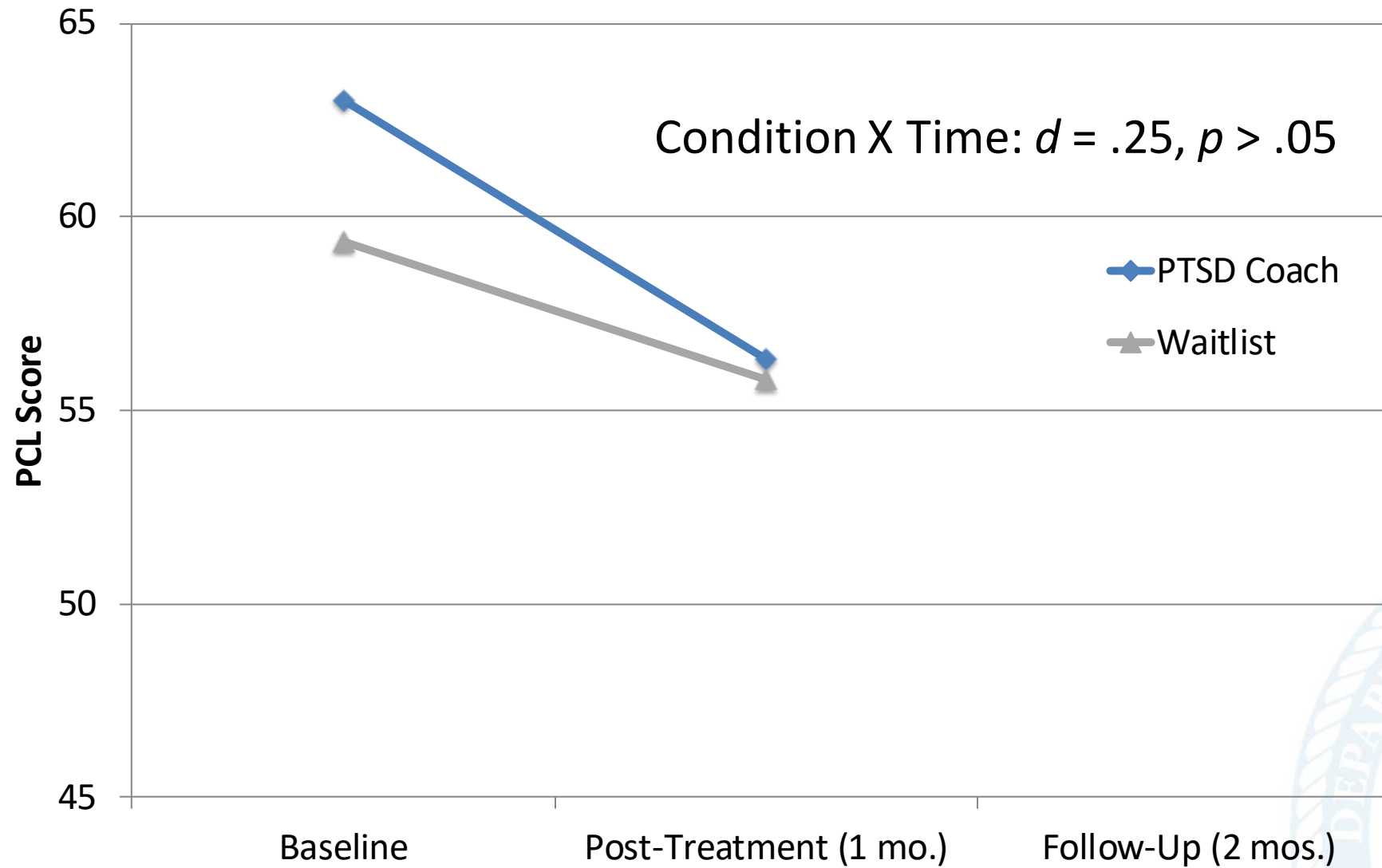
Potential Efficacy: Changes in PTSD symptoms
after 1 and 2 mos. of use (ES estimates to
inform future development and research)

Design: RCT with 1 mo. of PTSD Coach or
Waitlist (crossed over) and 2-mo. follow-up

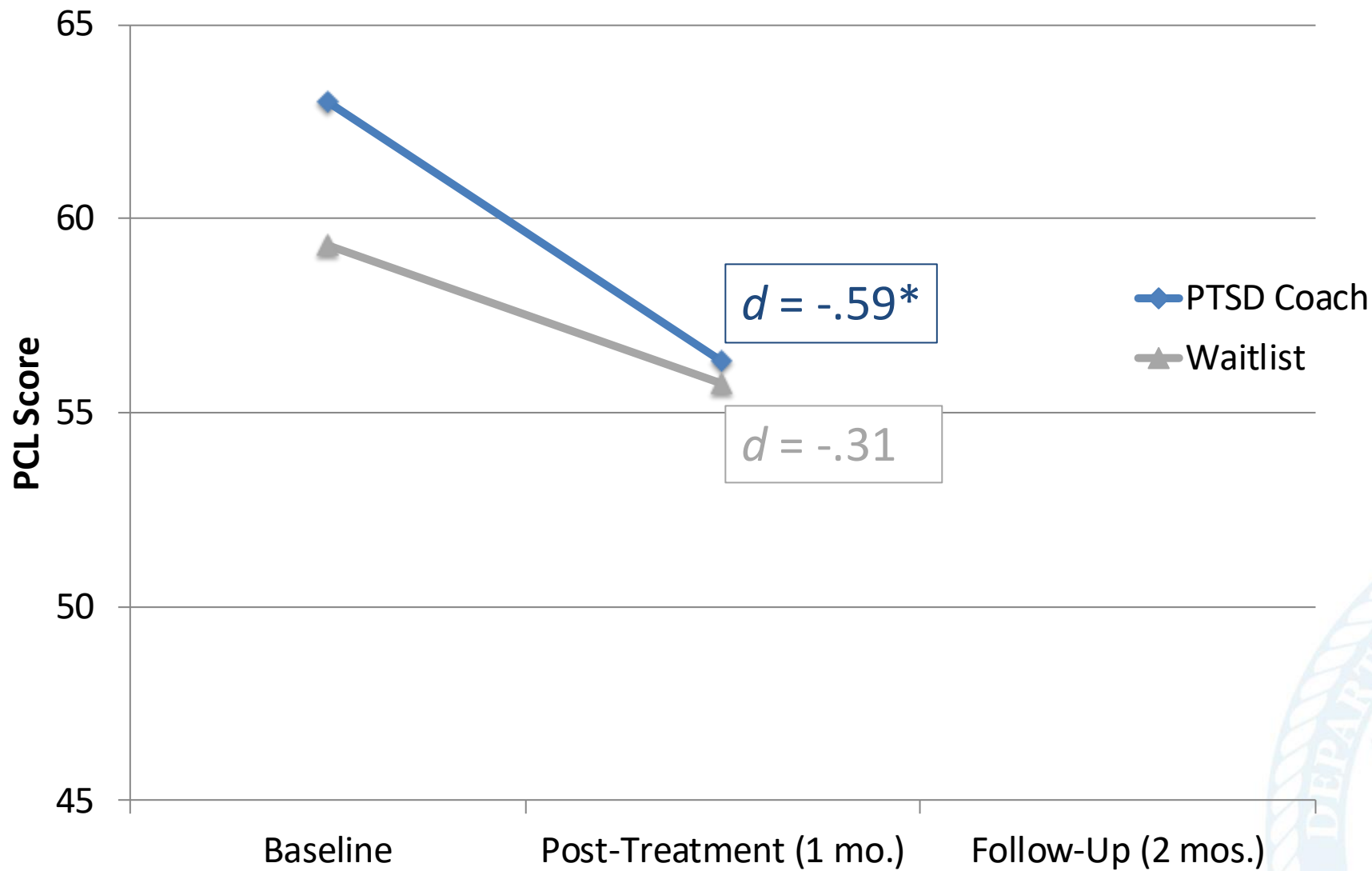
Participants ($N = 49$)	
Women	81.6% ($n = 40$)
Age (years)	45.7 ($SD = 13.9$)
White	55.1% ($n = 27$)
\geq Some College	77.6% ($n = 38$)
PCL-4 Total	61.5 ($SD = 11.0$)



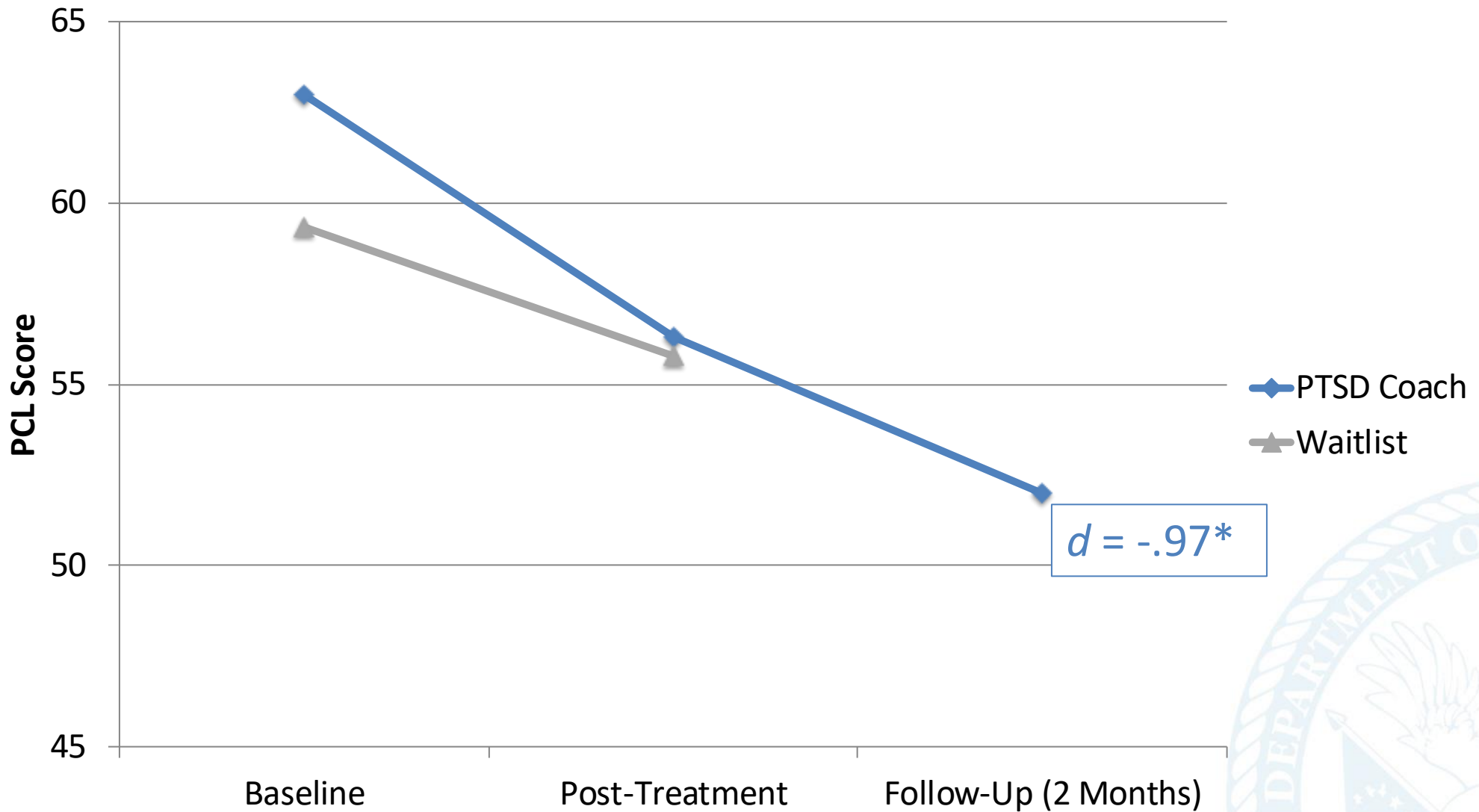
PTSD Symptom Improvement



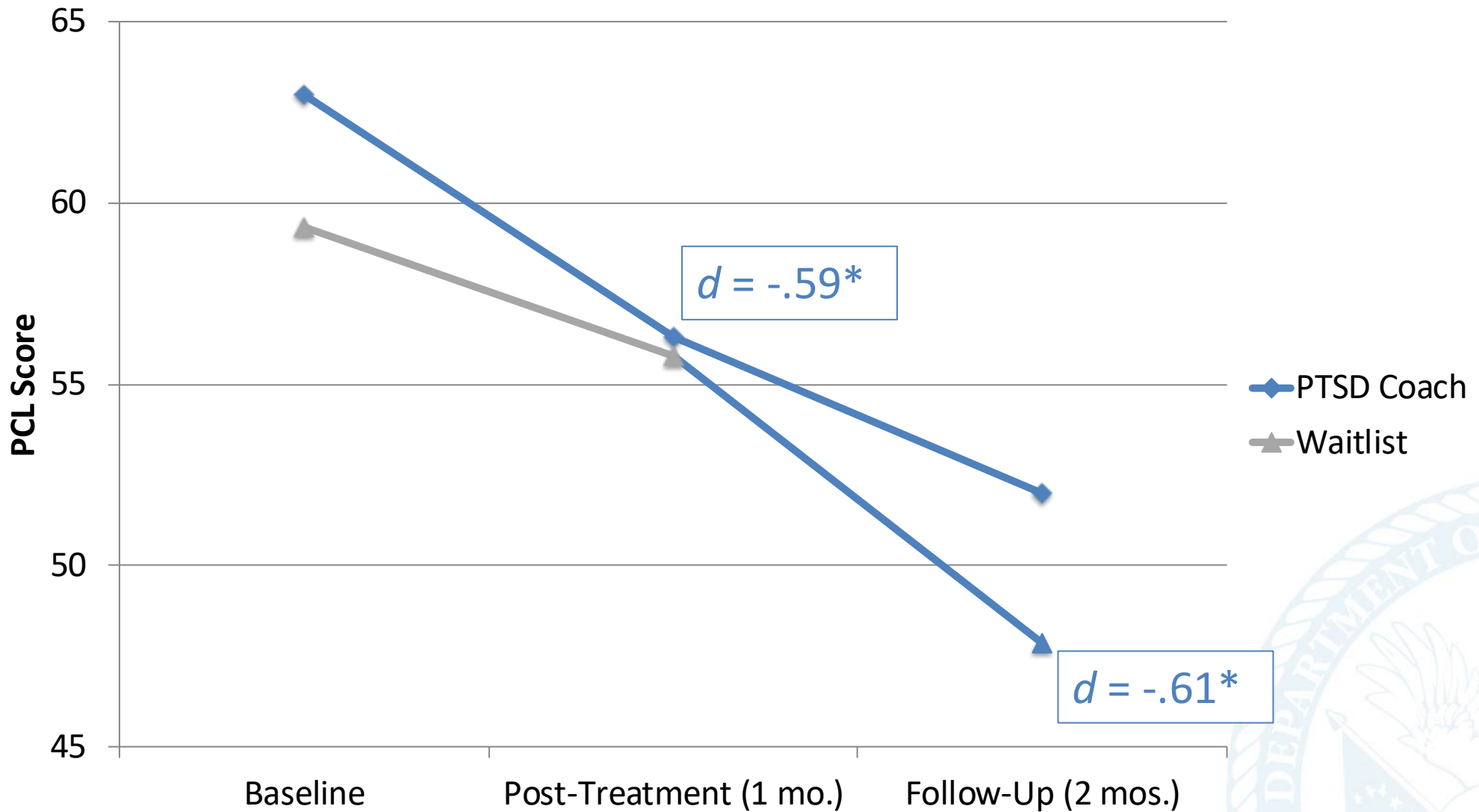
PTSD Symptom Improvement



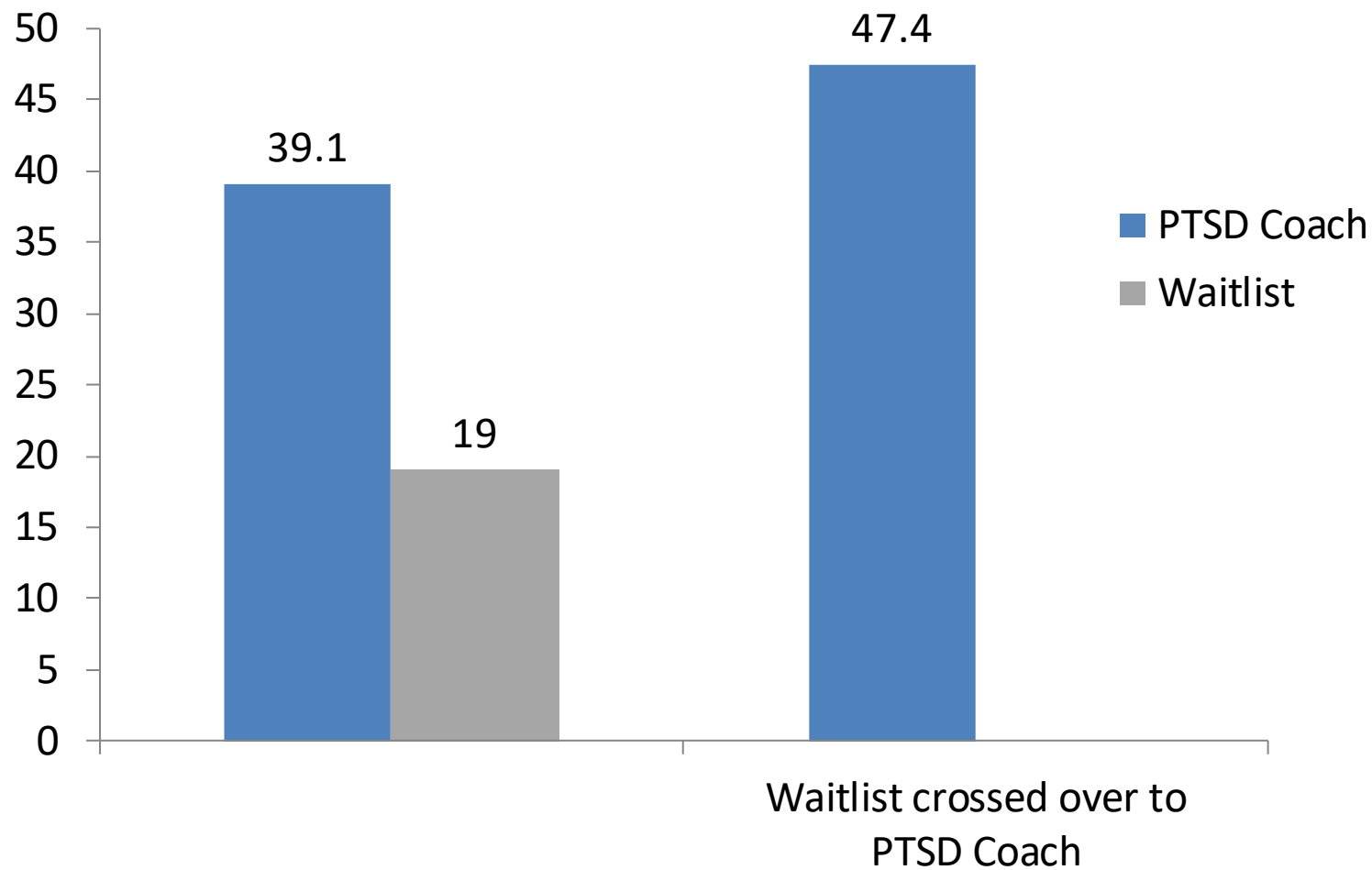
Maintenance of Symptom Improvement



Waitlist Crossed Over to PTSD Coach



% Clinically Significant Δ (≥ 10 PCL Decrease)



$\chi^2[1, N = 44] = 2.13, p = .145$



Important Preliminary Findings

Large symptom improvement ($d = -.97$) over 2 months suggesting longer intervention period would increase benefit

Self-reported weekly app use not related to PTSD symptom improvement

iPod Touch users did not benefit as much as smartphone owners:
PCL mean change -2.10 vs. -12.23



BRIEF REPORT

A Randomized Controlled Trial of a Smartphone App for Posttraumatic Stress Disorder Symptoms

Eric Kuhn

Veterans Affairs Palo Alto Health Care System, Palo Alto, California, and Stanford University School of Medicine

Nitya Kanuri

Stanford University School of Medicine

Julia E. Hoffman and Donn W. Garvert

Veterans Affairs Palo Alto Health Care System, Palo Alto, California

Josef I. Ruzek

Veterans Affairs Palo Alto Health Care System, Palo Alto, California, and Stanford University School of Medicine

C. Barr Taylor

Stanford University School of Medicine and Palo Alto University

Funding: VHA Clinic-in-Hand Initiative (PIs: Ruzek, Kuhn, & Hoffman)

Design: RCT with 3 mos. of PTSD Coach or Waitlist

Participants: Trauma survivors with PCL-4 ≥ 35 who owned a smartphone

Hypotheses:

1. PTSD Coach would have greater PTSD symptom improvement than waitlist
2. PTSD Coach effects would be maintained at follow-up (6 mos. post-baseline)

Participants ($N = 120$)

Women

69.2% ($n = 83$)

Age (years)

39.3 ($SD = 14.6$)

White

66.7% ($n = 80$)

\geq Some College

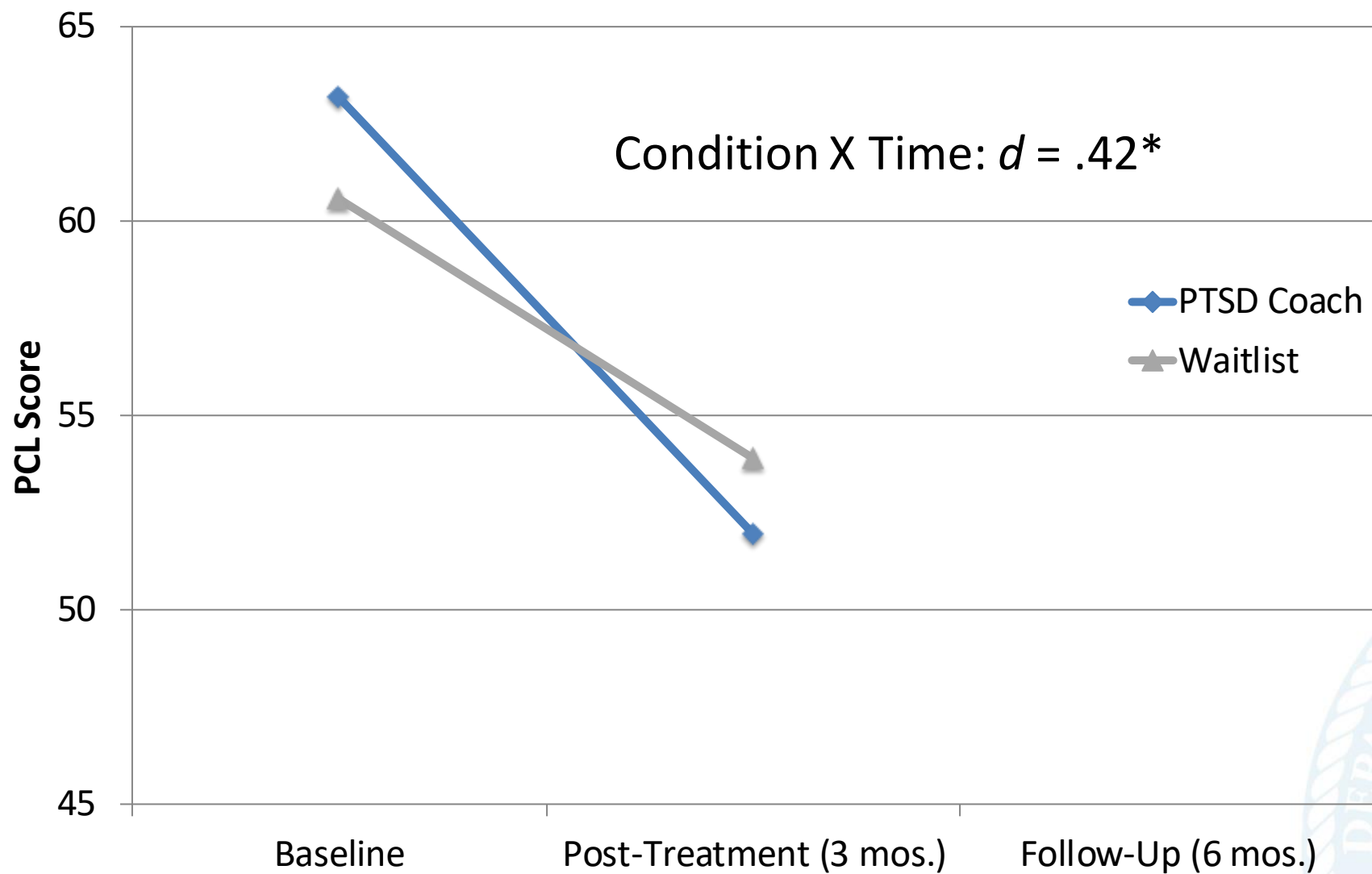
88.4% ($n = 106$)

PCL-4 Total

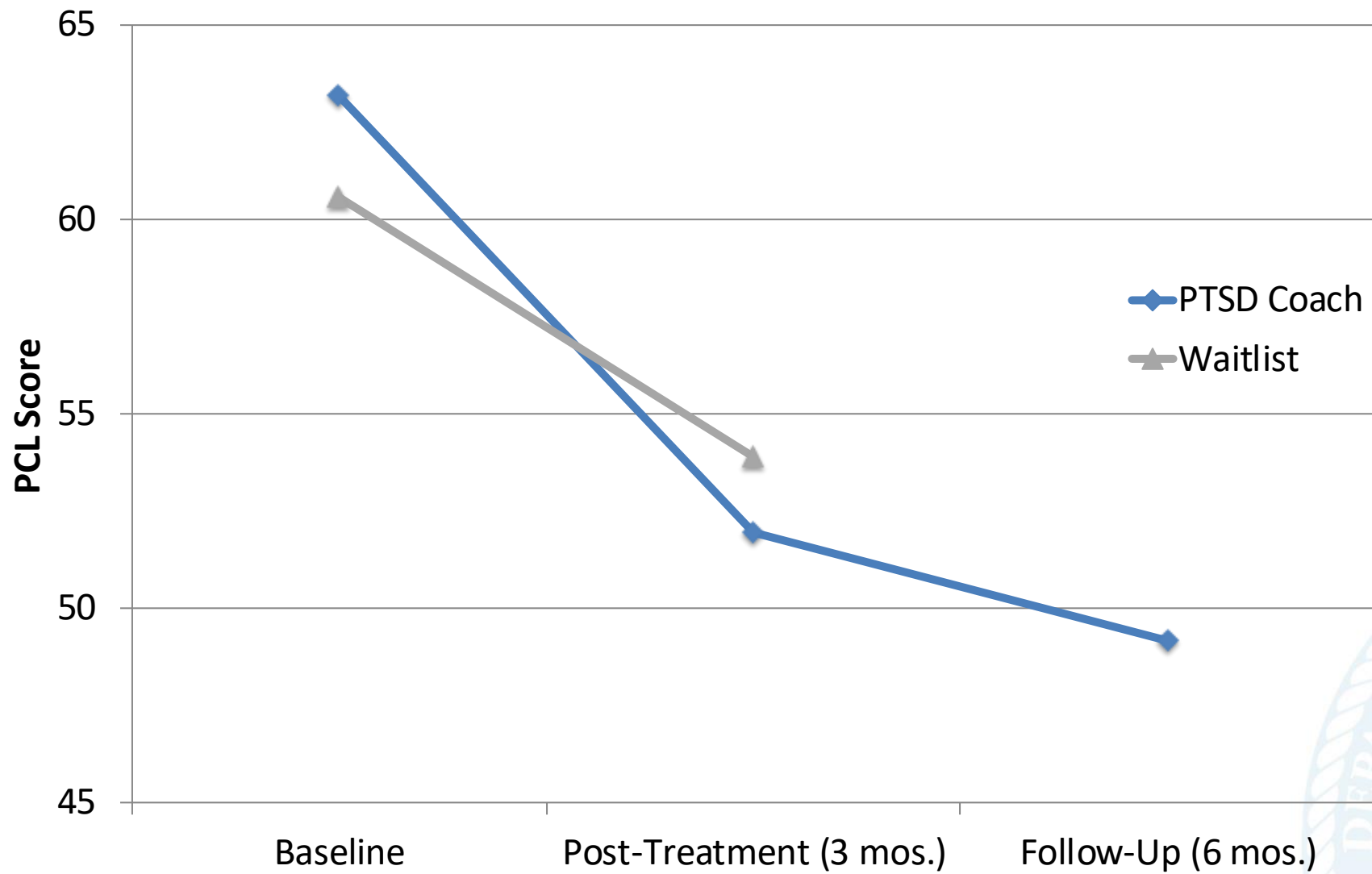
61.9 ($SD = 11.0$)



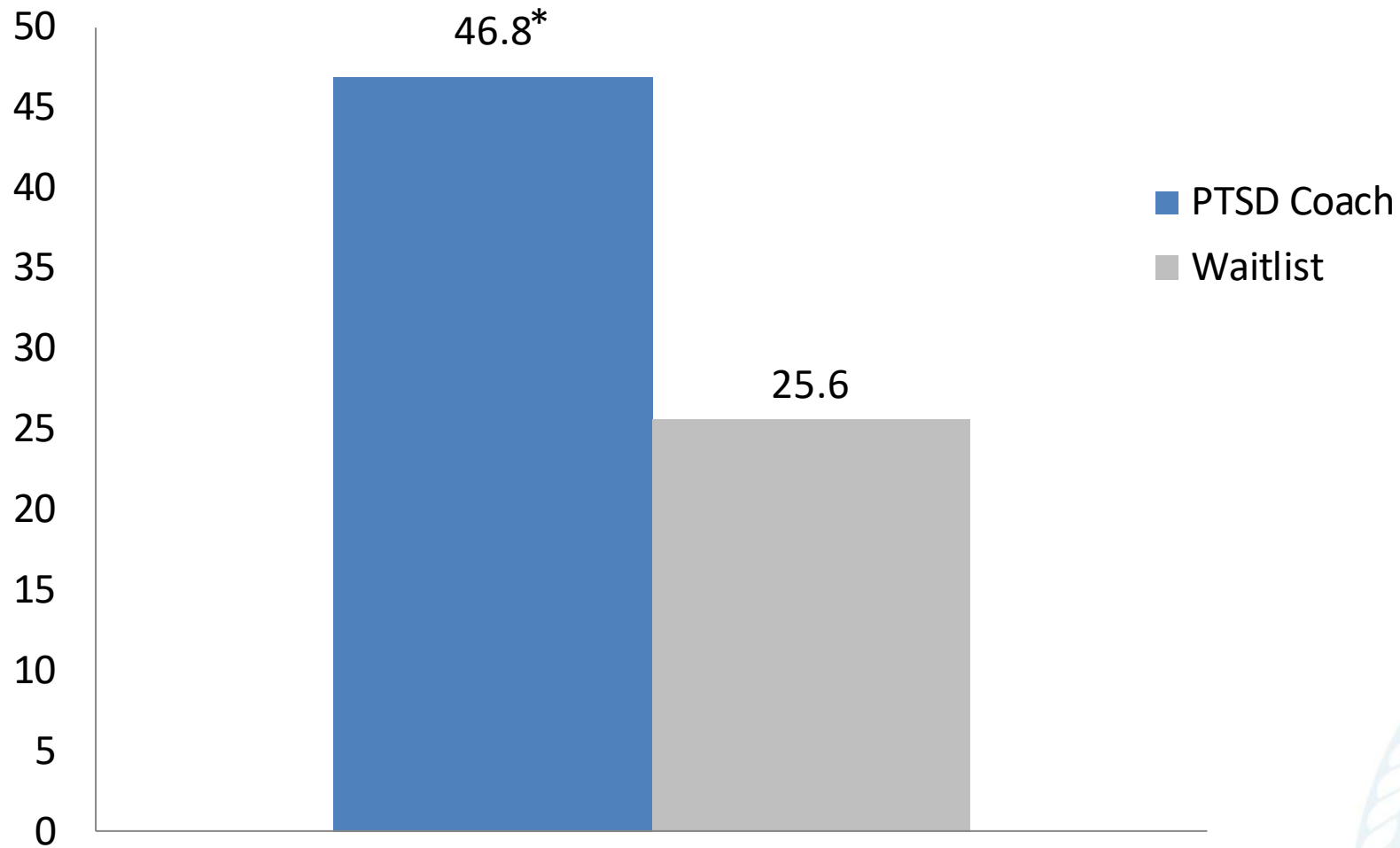
PTSD Symptom Improvement



Maintenance of Symptom Improvement



% Clinically Significant Δ (≥ 10 PCL Decrease)



$\chi^2 [1, N = 120] = 5.64, p = .018^*$



TBM

ORIGINAL RESEARCH



Development and refinement of a clinician intervention to facilitate primary care patient use of the PTSD Coach app

Kyle Possemato,¹ Eric Kuhn,² Emily M. Johnson,¹ Julia E. Hoffman,² Emily Brooks¹



Purpose: Develop Clinician-Supported PTSD Coach (CS-PTSD Coach) intervention

Method: Used Consolidated Framework of Implementation Research (CFIR)

Participants:

9 key organizational stakeholders (Phase 1)

9 patients with PTSD who received CS-PTSD Coach (Phase 2)

3 clinicians who delivered CS-PTSD Coach (Phase 3)

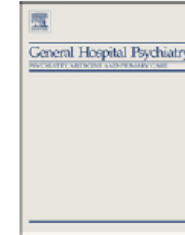




Contents lists available at ScienceDirect

General Hospital Psychiatry

journal homepage: <http://www.ghpjournal.com>



Using PTSD Coach in primary care with and without clinician support: a pilot randomized controlled trial☆☆☆



Kyle Possemato, Ph.D. ^{a,*}, Eric Kuhn, Ph.D. ^b, Emily Johnson, Ph.D. ^a, Julia E. Hoffman, Psy.D. ^b, Jason E. Owen, Ph.D. ^b, Nitya Kanuri, B.A. ^b, Leigha De Stefano, B.A. ^a, Emily Brooks, B.A. ^a

Design: RCT with assessments at baseline and 8 weeks:

CS-PTSD Coach: 4 brief (20-30 min.) sessions with PC-MHI provider

Self Management: 1 in-person session (10 min.)

Participants (N = 20):

VA primary care patients with PCL-4 ≥ 44

Not receiving or interested in receiving specialty MH care

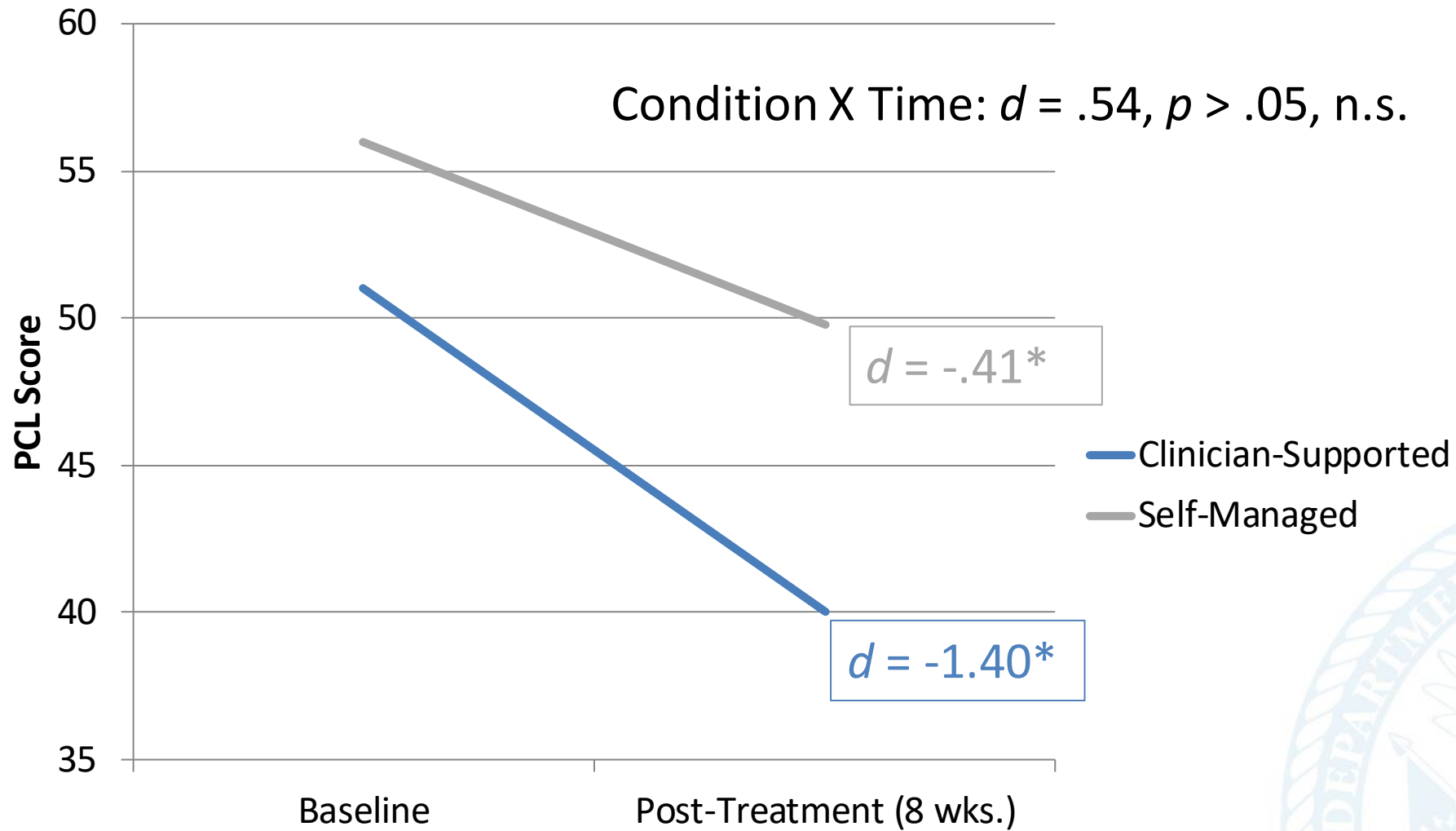
Hypotheses:

1. Both conditions would show improvements in PTSD sx's
2. CS-PTSD Coach would show greater improvement in PTSD symptoms and MH care initiation

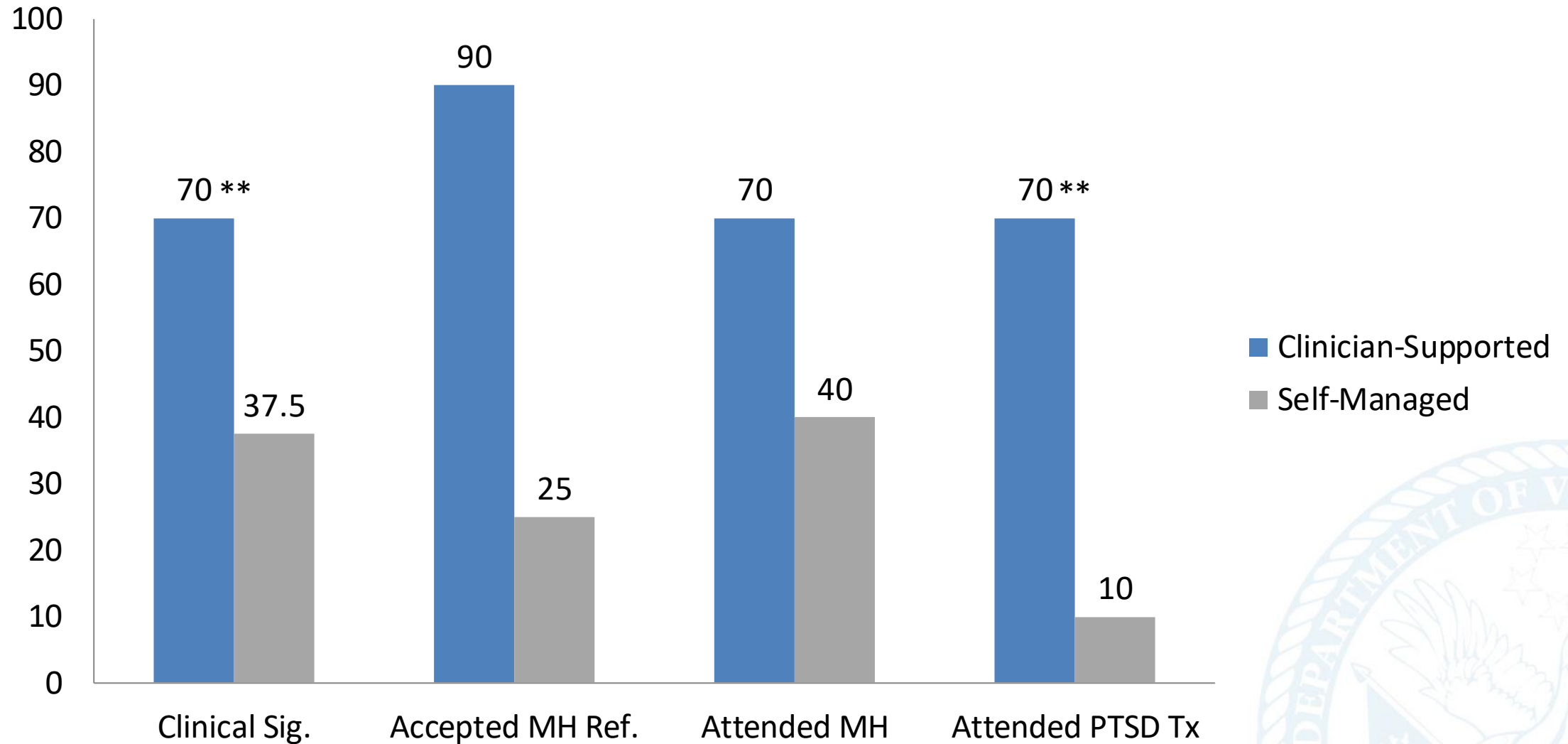
Participants (N = 20)	
Men	95% (n = 19)
Age (years)	42 (SD = 12)
White	65% (n = 13)
Employed	45% (n = 9)
OEF/OIF/OND Veterans	90% (n = 18)
PCL-4 Total	53.5 (SD = 11.5)



PTSD Symptom Improvement



% Clinically Significant Δ and MH Initiation



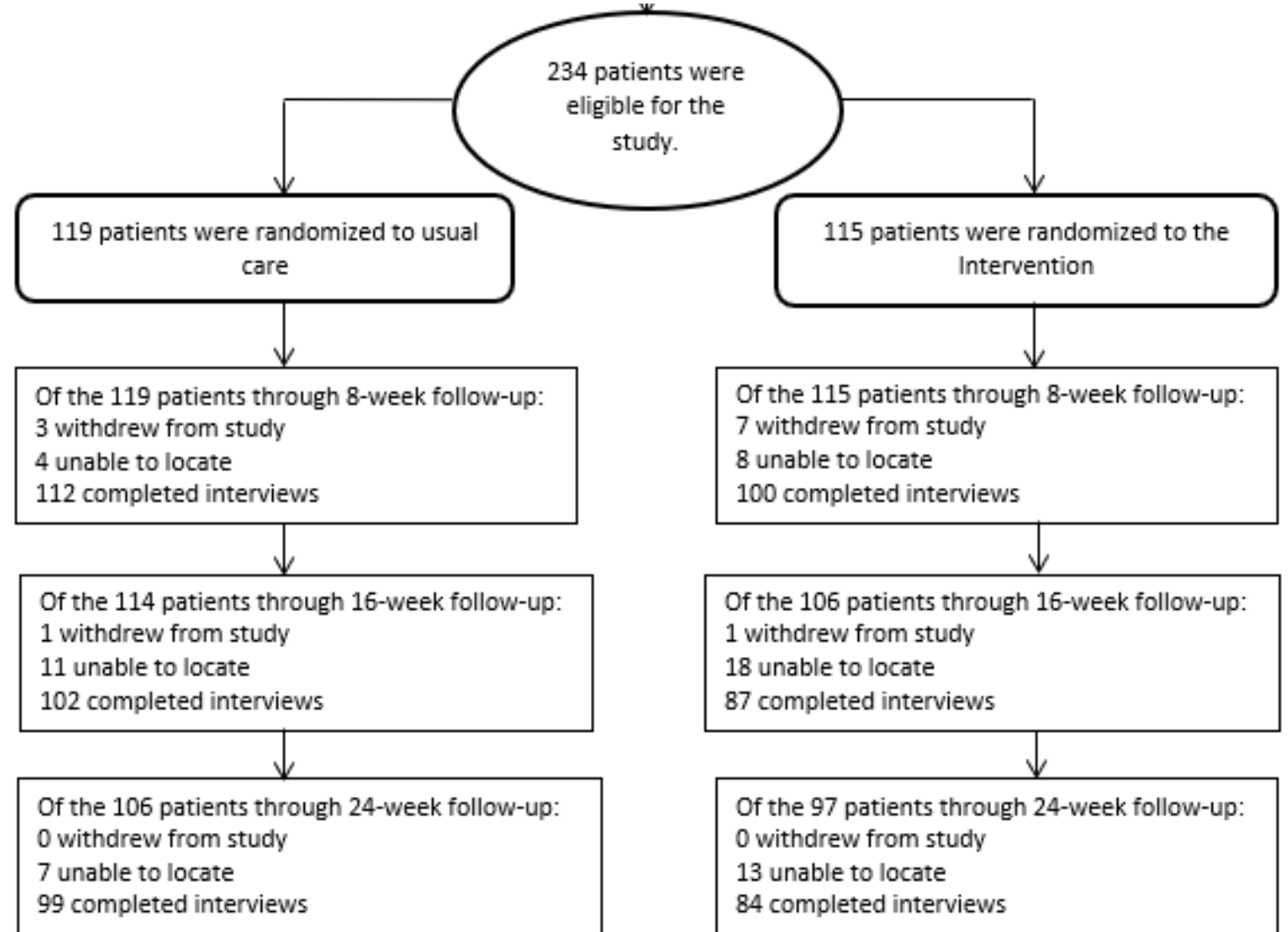
An RCT of a Primary Care-Based PTSD Intervention: Clinician-Supported PTSD Coach

Specific Aims:

1. Investigate impact of CS-PTSD Coach on PTSD severity
2. Investigate the impact of CS-PTSD Coach on engagement in specialty mental health care
3. Investigate patient and provider satisfaction with CS-PTSD Coach

Exploratory Aims:

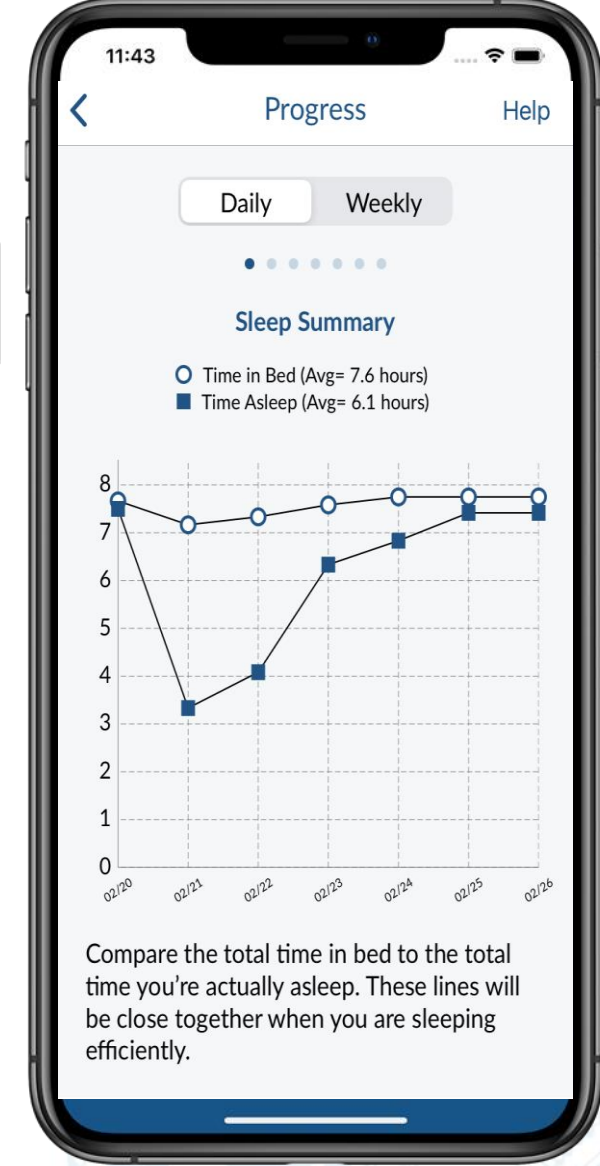
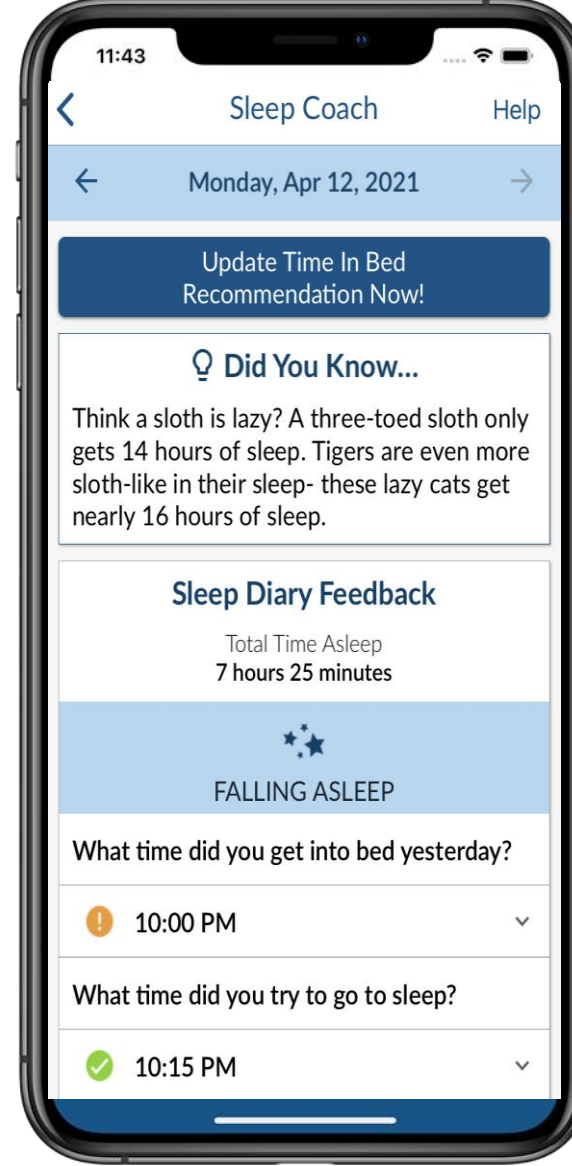
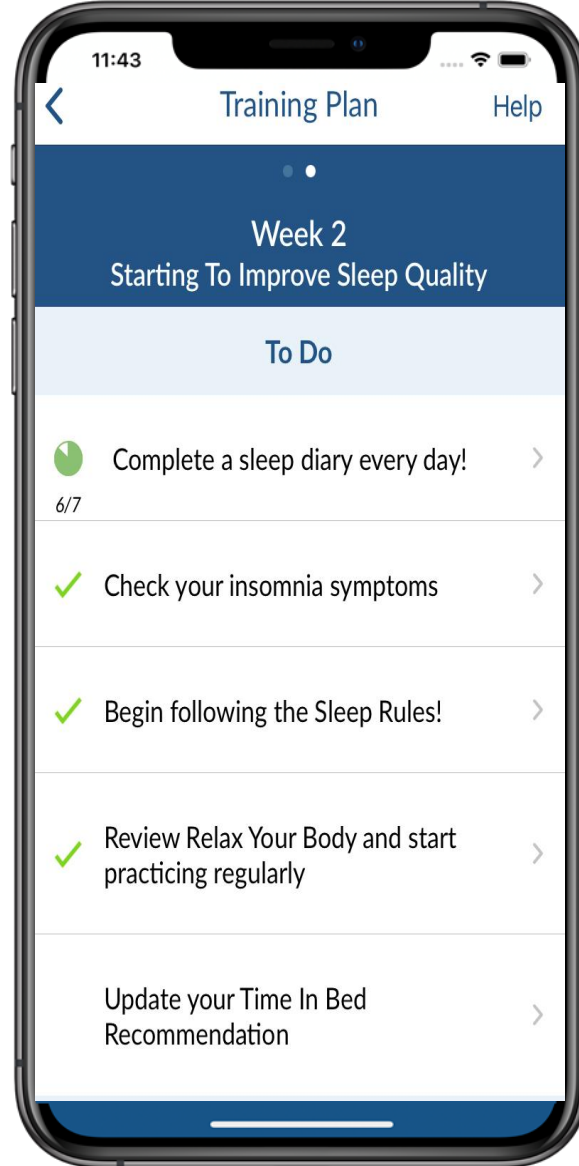
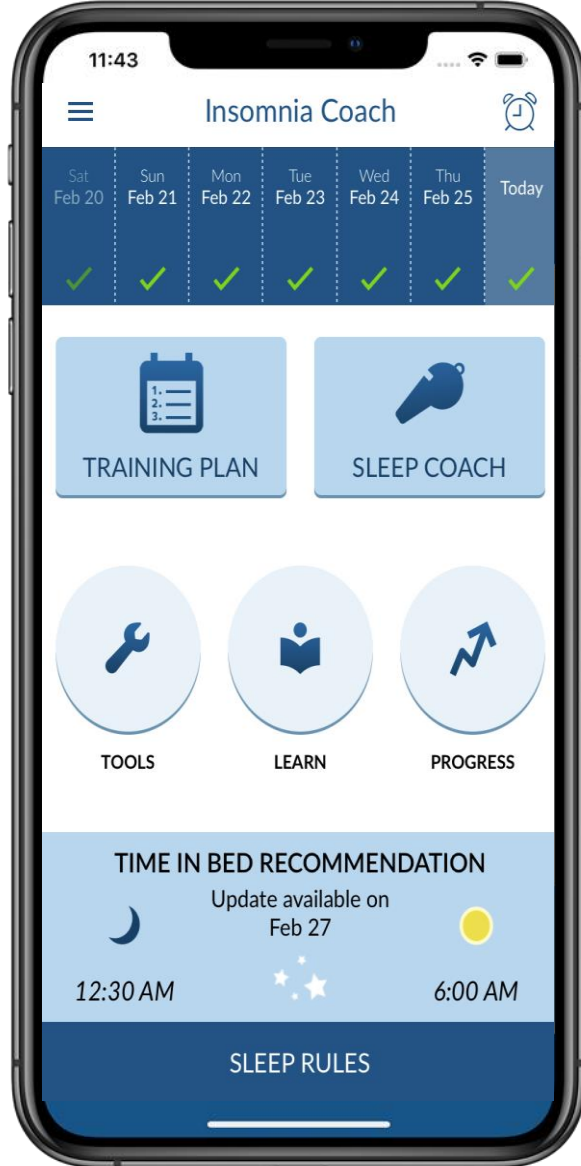
Explore potential treatment mediators (i.e., objective app use, coping self-efficacy) and moderators (e.g., baseline PTSD severity, co-morbid psychiatric symptoms)



Funding: VA HSR&D IIR Merit (PIs: Kuhn & Possemato)





Insomnia Coach





A Pilot Randomized Controlled Trial of the Insomnia Coach Mobile App to Assess Its Feasibility, Acceptability, and Potential Efficacy

Eric Kuhn ^{a, b}  , Katherine E. Miller ^c, Deloras Puran ^a, Joseph Wielgosz ^{a, b, d}, Sophie L. York Williams ^{a, e}, Jason E. Owen ^a, Beth K. Jaworski ^a, Haijing Wu Hallenbeck ^{a, b}, Shannon McCaslin ^{a, b}, Katherine Taylor ^a

Design: RCT with 6 weeks of Insomnia Coach or Waitlist

Participants: Veterans with probable Insomnia Disorder

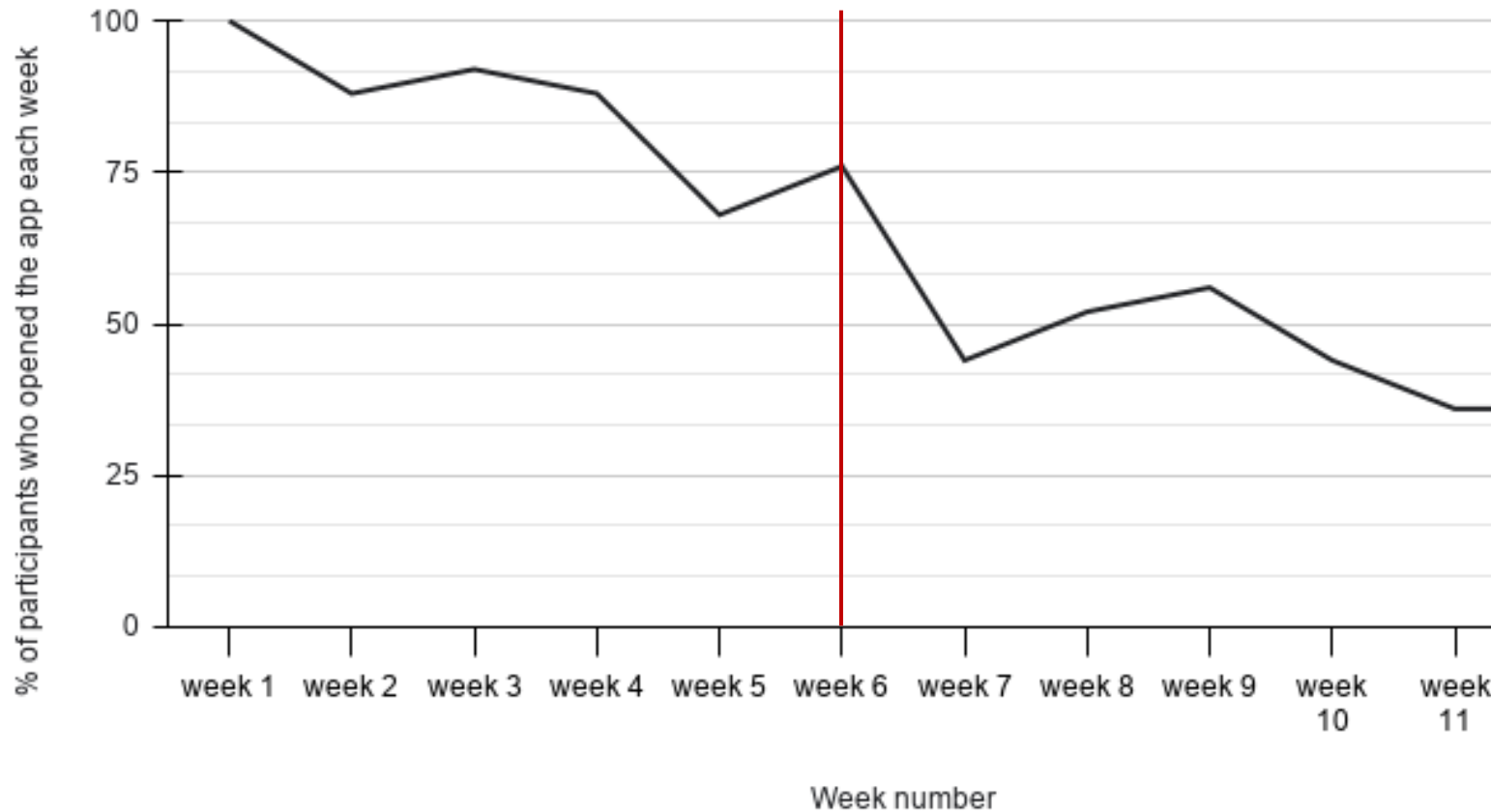
Hypotheses:

1. Insomnia Coach would be feasible, acceptable, and show greater insomnia symptom improvement than waitlist
2. Effects would be maintained at follow-up (12-weeks post-baseline)

Participants (<i>N</i> = 50)	
Men	58% (<i>n</i> = 29)
Age (years)	45 (<i>SD</i> = 7.9)
White	76% (<i>n</i> = 38)
ISI Total	16.9 (<i>SD</i> = 0.8)



Results: Feasibility

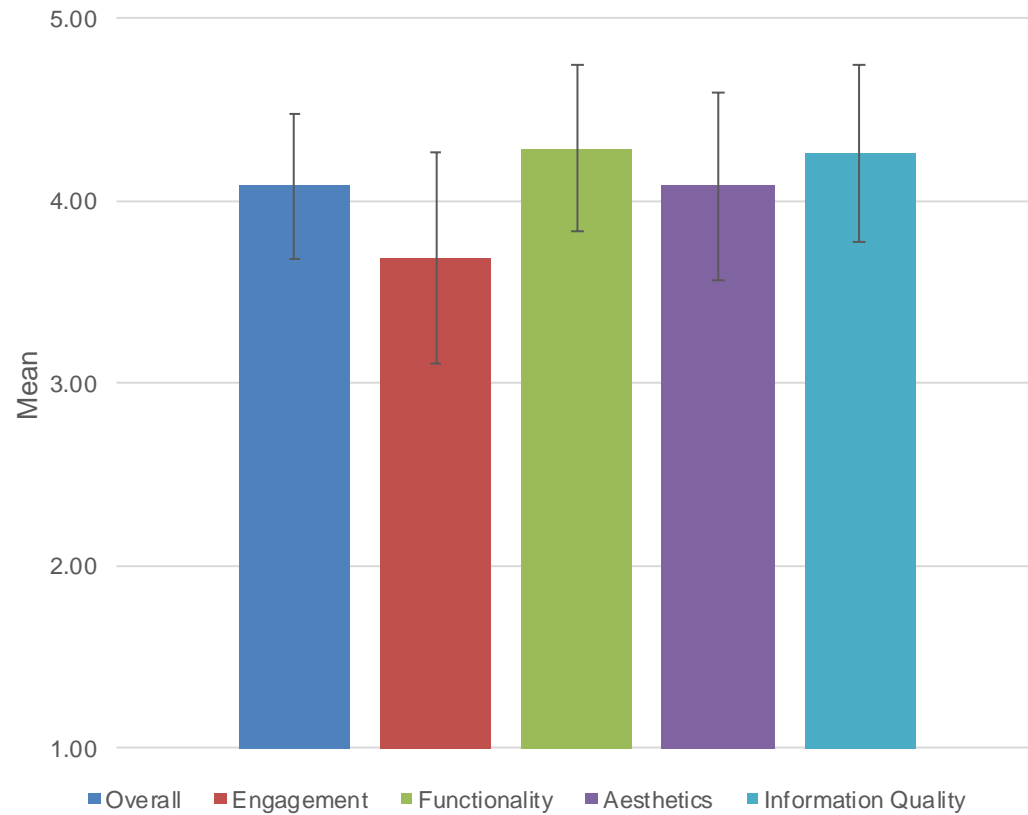


- Average app usage = 21.1 days (or 50% of treatment period)
- All participants engaged with features of training plan

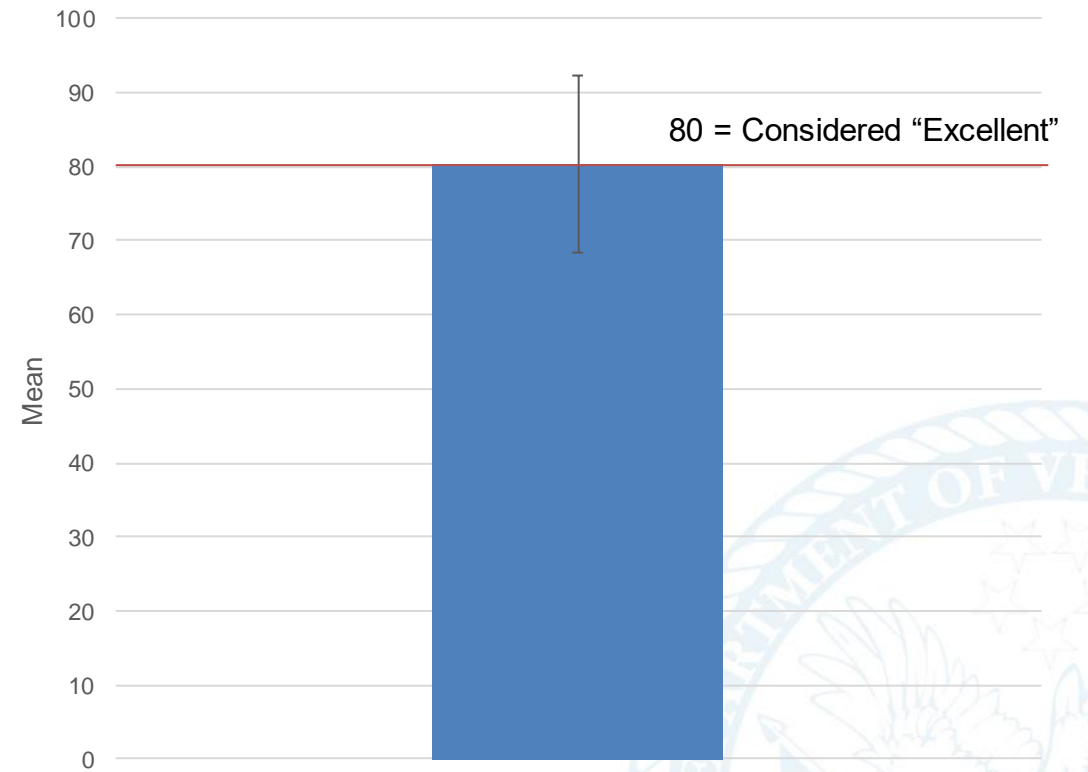


Results: Acceptability

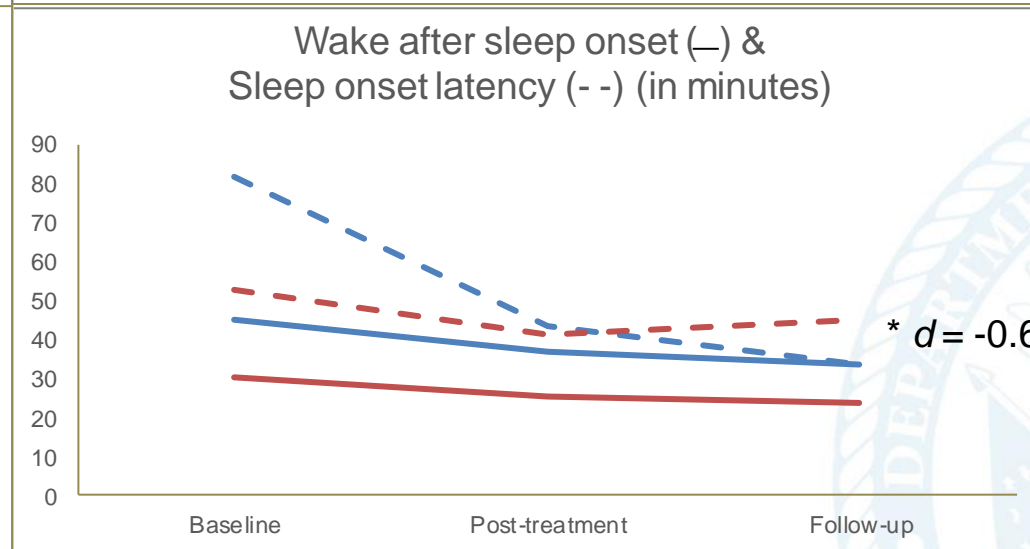
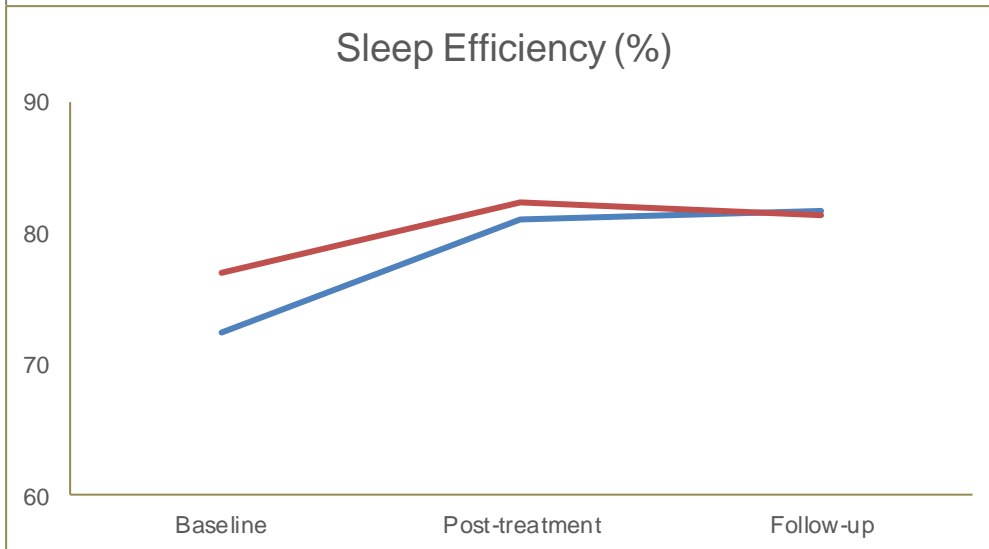
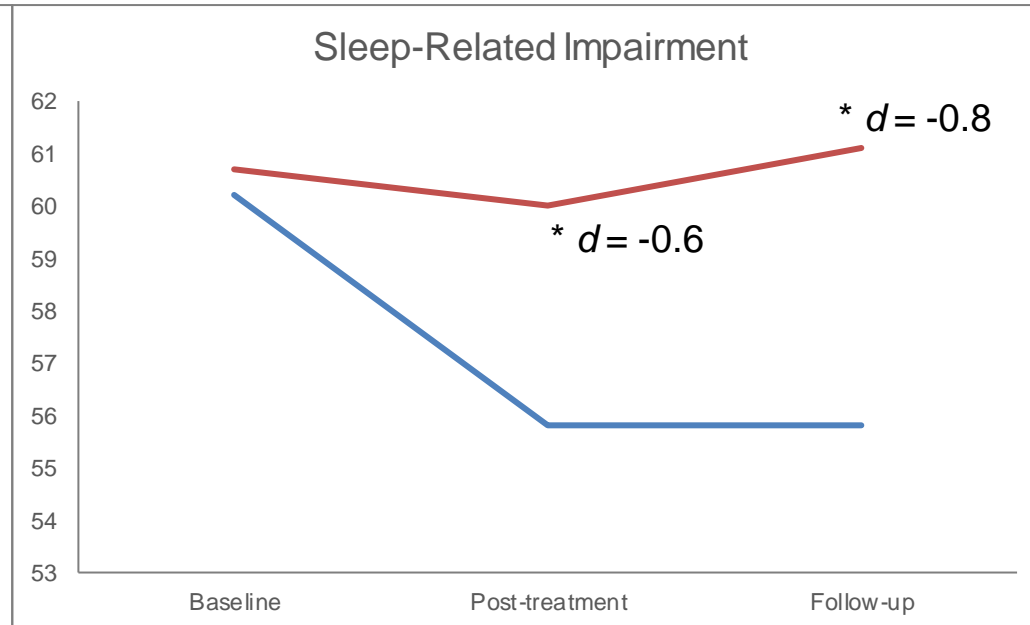
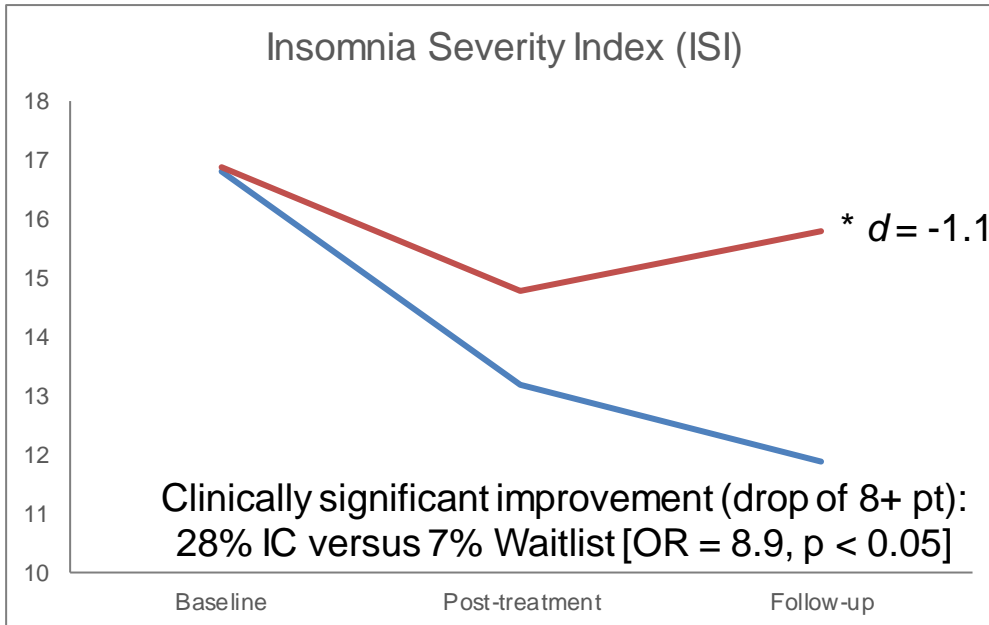
Mobile Apps Rating Scale-User



System Usability



Results: Potential Efficacy



Insomnia Coach
Waitlist





Disseminating Apps

UNDERSTANDING ADOPTION AND PROMOTING USE



A vast literature exists about factors that influence adoption of an innovation by individuals and organizations. Important perceptions of innovations include:

Relative advantage – Innovations with clear, unambiguous advantage in either effectiveness or cost-effectiveness are more easily adopted and implemented

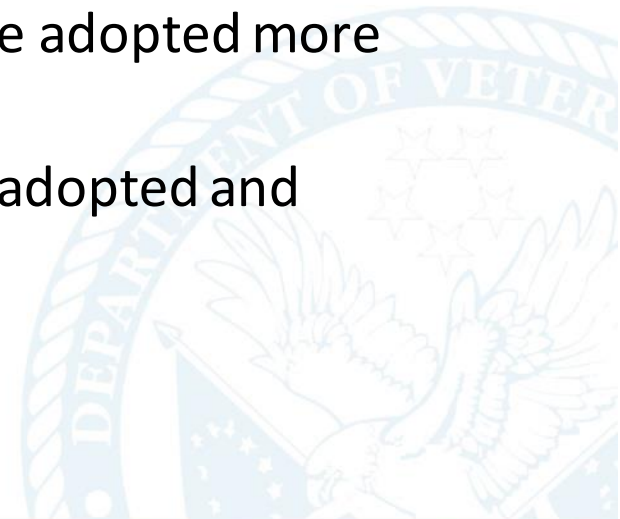
Compatibility – Innovations compatible with values, norms, and perceived needs are more readily adopted

Complexity - Innovations perceived as simple to use are more easily adopted

Observability – If adopters can observe the benefits of the innovation, it will be adopted more easily

Trialability – innovations that allow users to experiment on a limited basis are adopted and assimilated more easily

Based on *Diffusion of Innovations* (Rogers, 2003)



- Pre-release: Intent to use PE Coach (N = 163; Kuhn et al. 2014):
 - 76% agreed to some degree (i.e., 5-7 on a 7-point agreement scale) that they would use PE Coach if it were available
 - ↑Relative advantage & ↓complexity predicted intent to use
- Post-release (~1 yr.): Use of PE Coach (N = 271; Kuhn et al. 2015):
 - 50% reported using PE Coach
 - 93.6% intended to continue using it
 - 77.6% of those who hadn't used it intended to
 - ↓Complexity predicted use



Treatment Companion Apps: CBT-I Coach



- Pre-release: Intent to use CBT-I Coach (N = 138; Kuhn et al., 2016)
 - 87% agreed to some degree that they would use CBT-I Coach if it were available
 - ↑Relative advantage, ↑compatibility, ↓complexity predicted intent to use
- Post-release (~1 yr.): Use of CBT-I Coach (N = 108; Miller et al., 2017)
 - 50% reported using CBT-I Coach
 - 98% intended to continue using it
 - 83% of those who had not used it intended to
 - ↑Compatibility, ↓complexity, ↑trialability, ↑observability predicted use






































Self-Care Apps in VA Primary Care

- Among Primary Care MH providers ($N = 220$; Miller et al., 2019):
 - 83% reported using apps with 39% of their patients
- Some ways used:
 - 29% - providing a list of apps
 - 27% - recommending an app without instructions or follow-up
 - 24% - introducing an app with instructions (e.g., help patients download) but providing no follow-up
 - 25% - fully integrating app into treatment
- ↑relative advantage, ↑Compatibility, ↓complexity, ↑observability, & ↑trialability predicted use





PRESCRIPTION FOR BEHAVIORAL HEALTH *Mobile & Web Resources*

<input checked="" type="checkbox"/>	 PTSD Coach PMR  	<input type="checkbox"/>	 ACT Coach  	<input type="checkbox"/>	 Anger & Irritability Management (AIMS) https://www.veterantraining.va.gov/AIMS   
<input type="checkbox"/>	 PTSD Coach Online https://go.usa.gov/xN9Hb 	<input type="checkbox"/>	 CBT-i Coach  	<input type="checkbox"/>	 Moving Forward https://www.veterantraining.va.gov/movingforward/  
<input type="checkbox"/>	 PTSD Family Coach  	<input checked="" type="checkbox"/>	 Mindfulness Coach Body Scan  	<input type="checkbox"/>	 Parenting2Go https://www.veterantraining.va.gov/parenting/  
<input type="checkbox"/>	 CPT Coach  	<input type="checkbox"/>	 Mood Coach 	<input type="checkbox"/>	 VetChange https://www.ptsd.va.gov/apps/change/  
<input type="checkbox"/>	 PE Coach  	<input type="checkbox"/>	 STAIR Coach 		

Access free mobile apps and online resources here: www.ptsd.va.gov



RECOMMENDATION:

PMR, Mindfulness, or Breathe 2 Relax at least 1x per day.





JIF Mobile Mental Health Apps Project

January 2020 – December 2020



1,100 staff trained to become mHealth Ambassadors

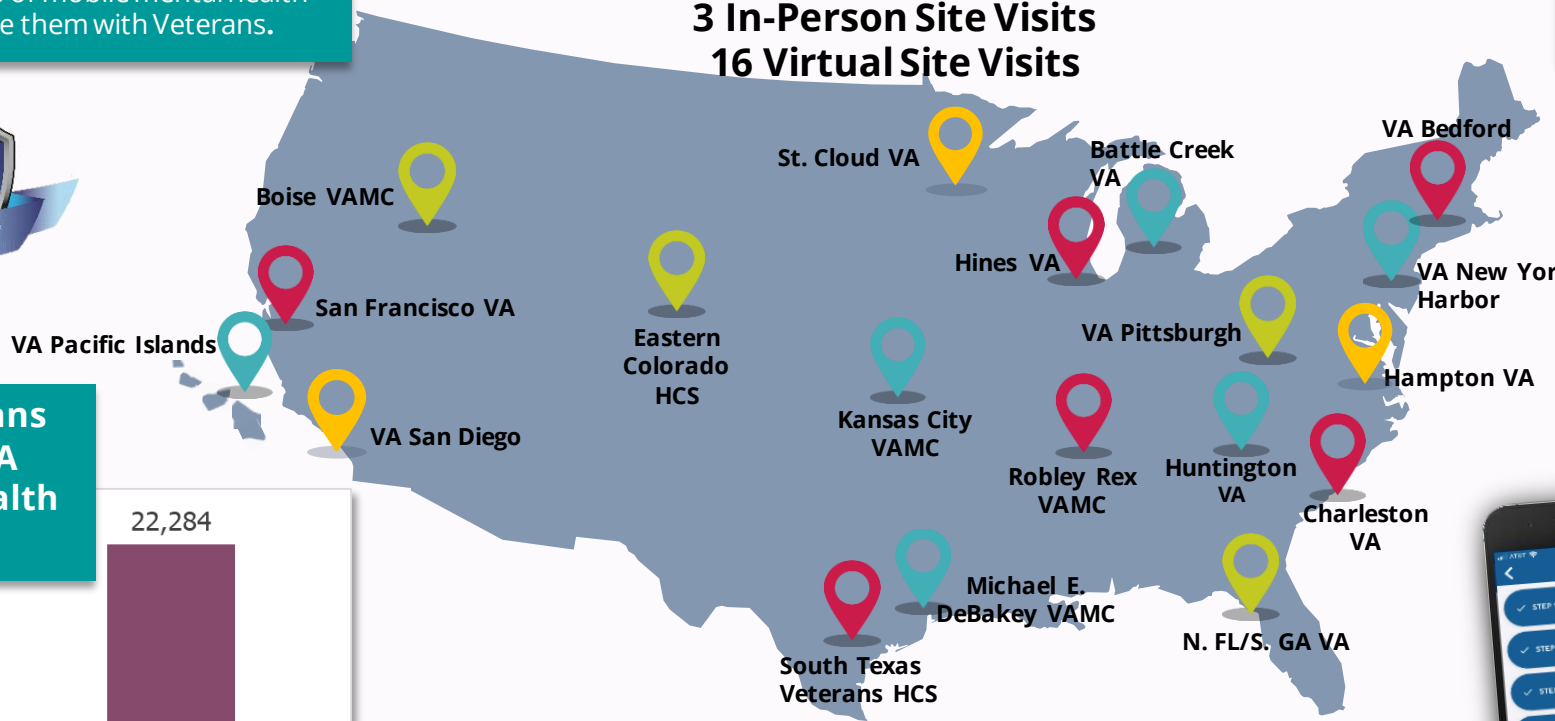
mHAs learned the basics of mobile mental health apps and how to share them with Veterans.

19 Sites Enrolled

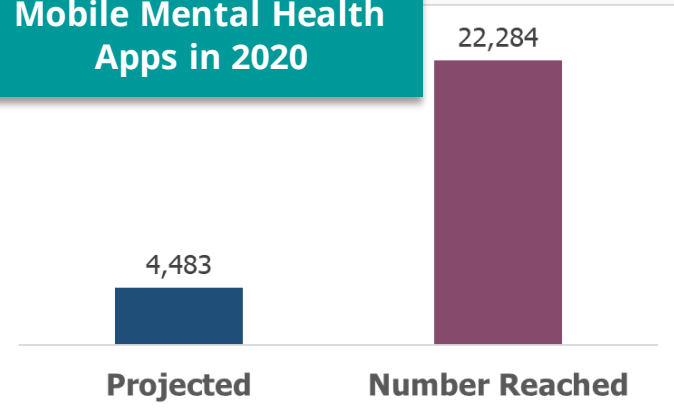
**3 In-Person Site Visits
16 Virtual Site Visits**

30 local site champions or mHealth Specialists

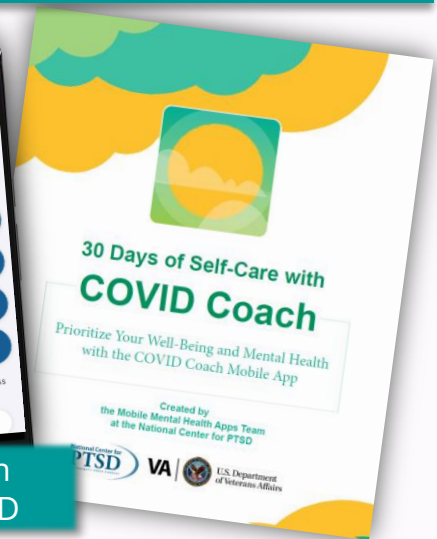
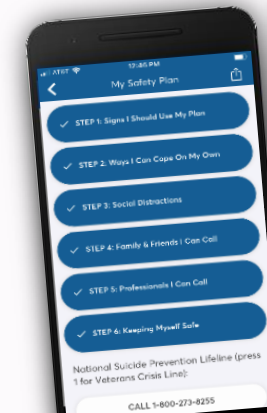
mHs serve as a resource for their site, sharing new materials and providing trainings



Number of Veterans Introduced to VA Mobile Mental Health Apps in 2020



Other Project-Related Products



Reach25@va.gov
www.ptsd.va.gov/appvid/mobile

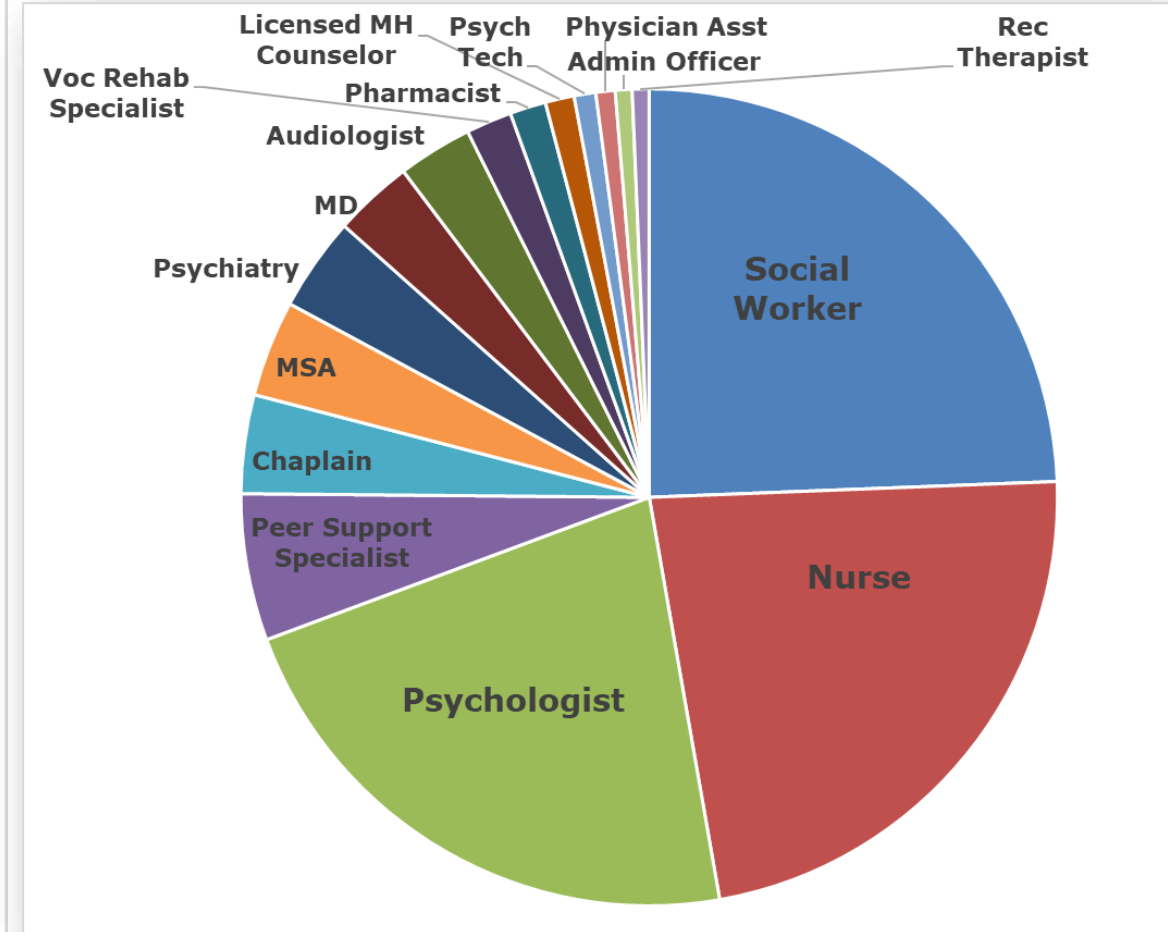
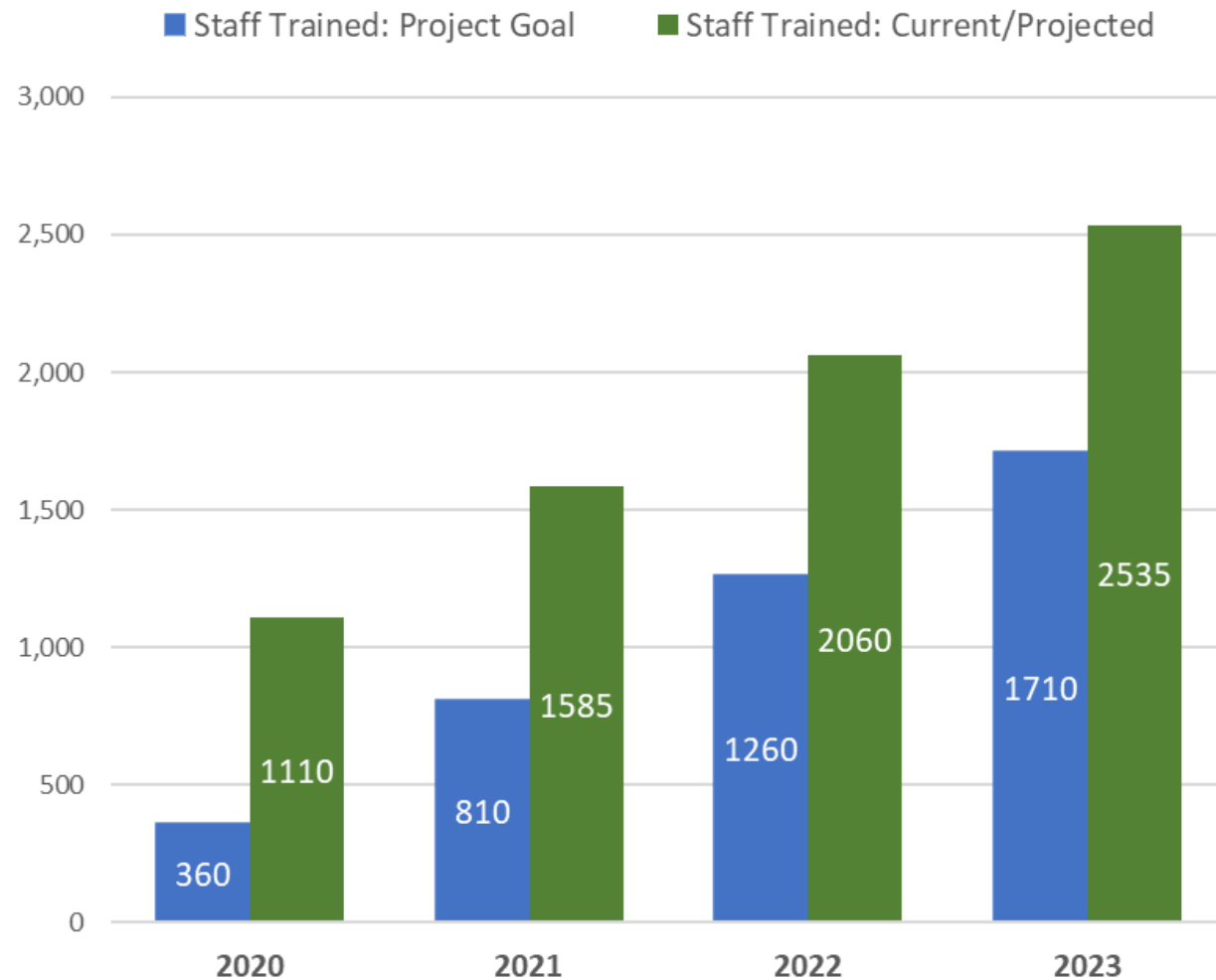


Digital Safety Plan Embedded in PTSD Coach

**Number Reached includes sites that have completed active implementation and projected goals for sites still in progress*

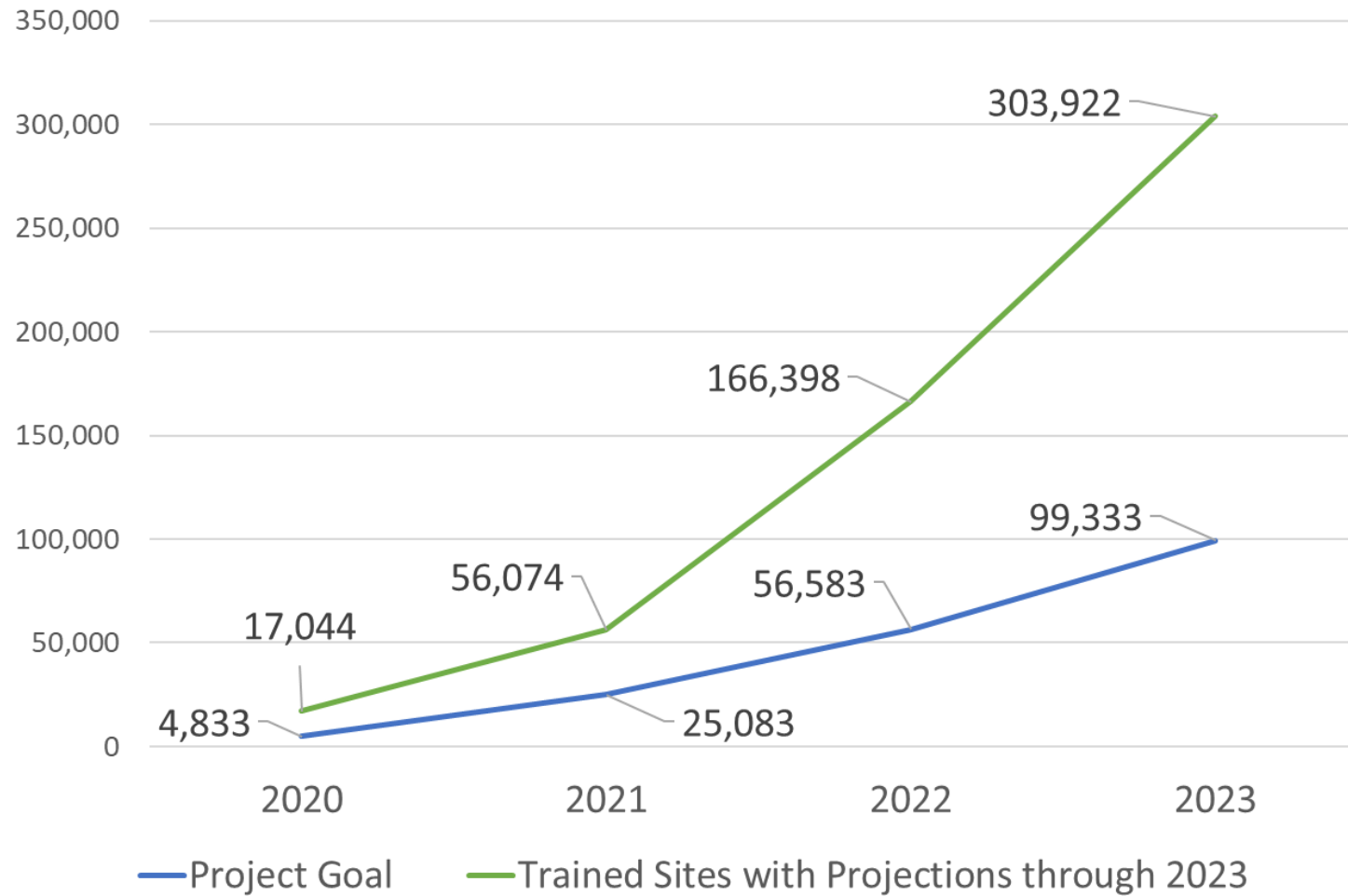
Exceeding Project Goals

Number of Staff Trained to Use Mobile Mental Health Apps with Veterans



Reaching our Veterans

Number of Veterans Introduced to VA Mobile Mental Health Apps



Dissemination Resources



To report bugs, offer suggestions, or ask questions about our apps:

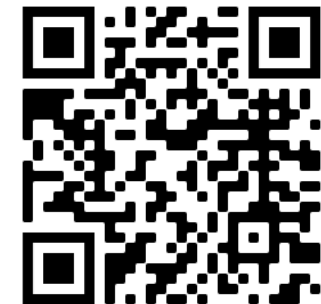
MobileMentalHealth@va.gov

Visit us online for additional materials and information:

- App descriptions, videos, and links: www.ptsd.va.gov/appvid/mobile
- Tech into Care website: www.ptsd.va.gov/professional/tech-care
- PBI Network CE Lecture Series: www.ptsd.va.gov/professional/tech-care/tech_lectures.asp
- To order free rack cards, Rx pads, and posters: <https://orders.gpo.gov/PTSD.aspx>

Download apps:

- iTunes/App Store
- Google Play Store





Practice-Based Implementation Network **CE LECTURE SERIES**



2nd Wednesday of the month, 12-1 ET / 9-10 PT

Open to anyone interested in learning more about the integration of technology into care for Veterans
CEUs available from ACCME, ACCME-NP, ANCC, APA, & ASWB

JUL 14 **Bottom Line Ethics for Digital Health**
Wednesday Michael Drane, MA, NCC & David Teachout, LMHC, MA, MS

AUG 11 **Expanding the Reach of VA Mobile Mental Health Apps**
Wednesday Pearl McGee-Vincent, PsyD

SEPT 08 **Stay Quit Coach**
Wednesday Ellen Herbst, MD

OCT 13 **The Potential of Massive Open Online Interventions and Digital Apothecaries**
Wednesday Ricardo F. Muñoz, PhD

NOV 10 **Topic TBD. Stay tuned!**
Wednesday Ken Weingardt, PhD

DEC 08 **mHealth Mindfulness for Caregivers of Older Adults with Cognitive Impairment**
Wednesday Elissa Kozlov, PhD

To request an Outlook invitation: MobileMentalHealth@va.gov
More details: www.ptsd.va.gov/professional/tech-care/tech_lectures.asp



Thank You!



Please feel free to contact me at:

eric.kuhn@va.gov or ekuhn@Stanford.edu

