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

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DVA/US Government Disclaimer:

• The contents of this presentation do not necessarily represent the views of the U.S. Department of Veterans Affairs or the United States Government.
## Mobile Mental Health Program

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  - Kelly Ramsey
  - Katherine Taylor
  - Sarah Steinmetz
  - Adrienne Heinz

- **Tech into Care**
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  - Katherine Juhasz
  - Andrea Jamison
  - Maggi Mackintosh
  - Colleen Becket-Davenport
  - Jeane Bosch
  - Shilpa Hampole
  - Shannon McCaslin
  - Justina Wu

- **Research**
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  - Jason Owen
  - Haijing Hallenbeck
  - Joe Wielgosz
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Developing Apps

A SUITE OF MOBILE APPS FOR SELF-MANAGEMENT AND TREATMENT SUPPORT
## Our Process for Developing a Mobile App

<table>
<thead>
<tr>
<th>Phase</th>
<th>SMEs: Expert content contributors</th>
<th>Mobile Apps Team: Product management, content development, UI</th>
<th>Development Team: Programming and design</th>
</tr>
</thead>
</table>
| 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 |
| | Write and edit content  
Suggest images, test early builds  
Submit GitHub issues  
Complete/finalize content documents  
Send final feedback on functionalities  
Test early builds | 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  
App design testing | Design app icon  
Program content and features  
Address GitHub issues  
Manage UI testing team  
Dev team testing  
UI team testing |
| Phase 2 | Confirm final functionalities with SMEs and dev team  
Weekly GitHub repository review  
Email team members issue reminders  
Functionality testing | Address GitHub issues  
Suggest and design functionalities  
Dev team testing |
| Phase 3 | Functionalities complete  
Content document testing  
Complete image selection  
Weekly GitHub repository review  
Email team members issue reminders | Address GitHub issues  
Suggest UI edits  
Dev team testing  
UI team testing |
| Phase 5 | Address GitHub issues | Triage issues with future update  
Typical user testing  
Beta testing pool management and GitHub facilitation |
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

Google Play

Reviews
4.5
999 total

PTSD Coach
The difference between the impossible and the possible lies in a person's determination.
- Henry Ford

PTSD Symptoms

About PTSD

MANAGE SYMPTOMS
TRACK PROGRESS
LEARN
GET SUPPORT

WHAT IS PTSD?
PTSD FACTS
HOW DOES PTSD DEVELOP?
HOW COMMON IS PTSD?
WHO DEVELOPS PTSD?
HOW LONG DOES PTSD LAST?
PROBLEMS RELATED TO PTSD
UNDERSTANDING PTSD TREATMENT

Manejo de síntomas

RECUERDOS DEL TRAUMA
EVITAR DETONANTES
DISTANCARSE DE LOS DEMÁS
DECONEXIONARSE DE LA REALIDAD
TRISTEZA O DESPERACERANZA
PESADILLAS O DESPIERGOS
SÍNCRONICO

Positive Imagery

The gentle sounds of the water lapping up onto the beach calm your mind, and allow you to feel even more relaxed.
Promise of App Use in Care

• 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

Relaxation exercises are opportunities to help your body learn to relax. Try each of the exercises to determine which ones are the most appealing and useful.
Emerging Direction: Provider Dashboards

Welcome back, David.

Dashboard Overview:
- **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.

Graph showing user activity over time.

- Users
NCPTSD Apps are...

- Free & publicly available in the app marketplaces
  - [www.ptsd.va.gov/appvid/mobile](http://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
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

Adam Miner  
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

<table>
<thead>
<tr>
<th>Participants (N = 49)</th>
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<tbody>
<tr>
<td>Women</td>
<td>81.6% (n = 40)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>45.7 (SD = 13.9)</td>
</tr>
<tr>
<td>White</td>
<td>55.1% (n = 27)</td>
</tr>
<tr>
<td>&gt;= Some College</td>
<td>77.6% (n = 38)</td>
</tr>
<tr>
<td>PCL-4 Total</td>
<td>61.5 (SD = 11.0)</td>
</tr>
</tbody>
</table>
PTSD Symptom Improvement

Condition X Time: $d = .25, p > .05$

- PTSD Coach
- Waitlist
PTSD Symptom Improvement

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Post-Treatment (1 mo.)</th>
<th>Follow-Up (2 mos.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTSD Coach</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waitlist</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$d = -0.59^*$

$d = -0.31$
Maintenance of Symptom Improvement

![Graph showing PCL Score changes over time for PTSD Coach and Waitlist groups. The graph indicates a significant decrease in symptom improvement with a Pearson's r value of \( d = -0.97^* \).]
Waitlist Crossed Over to PTSD Coach

- Baseline
- Post-Treatment (1 mo.)
- Follow-Up (2 mos.)

PCL Score

- PTSD Coach: $d = -0.59^*$
- Waitlist: $d = -0.61^*$
% Clinically Significant $\Delta$ (≥ 10 PCL Decrease)

$X^2[1, N = 44] = 2.13, p = .145$
Important Preliminary Findings

Large symptom improvement \((d = -0.97)\) 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
**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)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>69.2% (n = 83)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>39.3 (SD = 14.6)</td>
</tr>
<tr>
<td>White</td>
<td>66.7% (n = 80)</td>
</tr>
<tr>
<td>&gt;= Some College</td>
<td>88.4% (n = 106)</td>
</tr>
<tr>
<td>PCL-4 Total</td>
<td>61.9 (SD = 11.0)</td>
</tr>
</tbody>
</table>

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

Condition X Time: $d = .42^*$

Baseline, Post-Treatment (3 mos.), Follow-Up (6 mos.)

PCL Score
Maintenance of Symptom Improvement

- Baseline
- Post-Treatment (3 mos.)
- Follow-Up (6 mos.)

PTSD Score

- PTSD Coach
- Waitlist
% Clinically Significant ∆ (≥ 10 PCL Decrease)

χ² [1, N = 120] = 5.64, p = .018*

PTSD Coach: 46.8%
Waitlist: 25.6%
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)
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
  2. CS-PTSD Coach would show greater improvement in PTSD symptoms and MH care initiation

<table>
<thead>
<tr>
<th>Participants (N = 20)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>95% (n = 19)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>42 (SD = 12)</td>
</tr>
<tr>
<td>White</td>
<td>65% (n = 13)</td>
</tr>
<tr>
<td>Employed</td>
<td>45% (n = 9)</td>
</tr>
<tr>
<td>OEF/OIF/OND Veterans</td>
<td>90% (n = 18)</td>
</tr>
<tr>
<td>PCL-4 Total</td>
<td>53.5 (SD = 11.5)</td>
</tr>
</tbody>
</table>
PTSD Symptom Improvement

Condition X Time: $d = .54$, $p > .05$, n.s.

$PCL$ Score

Baseline | Post-Treatment (8 wks.)
--- | ---
Clinician-Supported | Self-Managed

$d = -.41^*$

$d = -1.40^*$
% Clinically Significant Δ and MH Initiation

- Clinical Sig.: 70**
- Accepted MH Ref.: 90
- Attended MH: 70
- Attended PTSD Tx: 70**

Clinician-Supported
Self-Managed
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

**Training Plan**

**Week 2**
Starting To Improve Sleep Quality

**To Do**
- Complete a sleep diary every day!
- Check your insomnia symptoms
- Begin following the Sleep Rules!
- Review Relax Your Body and start practicing regularly
- Update your Time In Bed Recommendation

**Sleep Coach**

**Monday, Apr 12, 2021**

**Update Time In Bed Recommendation Now!**

**Did You Know...**
Think a sloth is lazy? A three-toed sloth only gets 14 hours of sleep. Tigers are even more sloth-like in their sleep - these lazy cats get nearly 16 hours of sleep.

**Sleep Diary Feedback**
Total Time Asleep
7 hours 25 minutes

**FALLING ASLEEP**

What time did you get into bed yesterday?
- 10:00 PM

What time did you try to go to sleep?
- 10:15 PM

**Sleep Summary**

- Time in Bed (Avg: 7.6 hours)
- Time Asleep (Avg: 6.1 hours)

Compare the total time in bed to the total time you're actually asleep. These lines will be close together when you are sleeping efficiently.
A Pilot Randomized Controlled Trial of the Insomnia Coach Mobile App to Assess Its Feasibility, Acceptability, and Potential Efficacy

Eric Kuhn, Katherine E. Miller, Deloras Puran, Joseph Wielgosz, Sophie L. York Williams, Jason E. Owen, Beth K. Jaworski, Haijing Wu Hallenberg, Shannon McCaslin, Katherine Taylor

**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 ($N = 50$)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>58% ($n = 29$)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>45 ($SD = 7.9$)</td>
</tr>
<tr>
<td>White</td>
<td>76% ($n = 38$)</td>
</tr>
<tr>
<td>ISI Total</td>
<td>16.9 ($SD = 0.8$)</td>
</tr>
</tbody>
</table>
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

80 = Considered “Excellent”
Results: Potential Efficacy

Clinically significant improvement (drop of 8+ pt): 28% IC versus 7% Waitlist [OR = 8.9, p < 0.05]

Insomnia Severity Index (ISI)

Sleep-Related Impairment

Sleep Efficiency (%)

Wake after sleep onset (—) & Sleep onset latency (- -) (in minutes)

* $d = -1.1$

* $d = -0.6$

* $d = -0.8$

* $d = -0.6$
Disseminating Apps

UNDERSTANDING ADOPTION AND PROMOTING USE
Perceptions of a New Practice

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)
Treatment Companion Apps: PE Coach

• 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
• $\uparrow$relative advantage, $\uparrow$Compatibility, $\downarrow$complexity, $\uparrow$observability, & $\uparrow$trialability predicted use
VA DMHI Prescription Pad

PRESCRIPTION FOR BEHAVIORAL HEALTH
Mobile & Web Resources

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

RECOMMENDATION:
PMR, Mindfulness, or Breathe 2 Relax at least 1x per day.
1,100 staff trained to become mHealth Ambassadors
mHAs learned the basics of mobile mental health apps and how to share them with Veterans.

30 local site champions or mHealth Specialists
mHSSs 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

<table>
<thead>
<tr>
<th>Projected</th>
<th>Number Reached</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,483</td>
<td>22,284</td>
</tr>
</tbody>
</table>

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

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

Digital Safety Plan Embedded in PTSD Coach

Other Project-Related Products

JIF Mobile Mental Health Apps Project
January 2020 – December 2020

19 Sites Enrolled
3 In-Person Site Visits
16 Virtual Site Visits

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

VA Pacific Islands
San Francisco VA
VA San Diego
Eastern Colorado HCS
St. Cloud VA
Hines VA
Battle Creek VA
Kansas City VAMC
VA Pittsburgh
Robley Rex VAMC
Huntington VA
Charleston VA
N. FL/S. GA VA
South Texas Veterans HCS
Michael E. DeBakey VAMC
Hampton VA
VA Bedford
VA New York Harbor
VA New York
Robley Rex VAMC
Hines VA
St. Cloud VA
Kansas City VAMC
VA Pittsburgh
VA San Diego
Eastern Colorado HCS
San Francisco VA
VA Pacific Islands
Exceeding Project Goals

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

- **Staff Trained: Project Goal**
- **Staff Trained: Current/Projected**

<table>
<thead>
<tr>
<th>Year</th>
<th>Staff Trained: Project Goal</th>
<th>Staff Trained: Current/Projected</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>360</td>
<td>1110</td>
</tr>
<tr>
<td>2021</td>
<td>810</td>
<td>1585</td>
</tr>
<tr>
<td>2022</td>
<td>1260</td>
<td>2060</td>
</tr>
<tr>
<td>2023</td>
<td>1710</td>
<td>2535</td>
</tr>
</tbody>
</table>

Pie chart showing the distribution of trained staff by profession:
- **Social Worker**
- **Nurse**
- **Psychologist**
- **MSA**
- **MD**
- **Chaplain**
- **Peer Support Specialist**
- **Physician Asst Admin Officer**
- **Physician**
- **Pharmacist**
- **Psych Tech**
- **Licensed MH Counselor**
- **Voc Rehab Specialist**
- **Rec Therapist**
Reaching our Veterans

Number of Veterans Introduced to VA Mobile Mental Health Apps

- Project Goal
- Trained Sites with Projections through 2023

- 2020: 4,833
- 2021: 17,044
- 2022: 56,583
- 2023: 303,922

- 2021: 25,083
- 2022: 56,074
- 2023: 99,333

National Center for PTSD
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
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
Wednesday
Bottom Line Ethics for Digital Health
Michael Drane, MA, NCC & David Teachout, LMHC, MA, MS

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

SEPT 08
Wednesday
Stay Quit Coach
Ellen Herbst, MD

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

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

DEC 08
Wednesday
mHealth Mindfulness for Caregivers of Older Adults with Cognitive Impairment
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