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TITLE: Improving Access to Care for Warfighters: Virtual Worlds Technology to Enhance Primary Care Training in Post-Traumatic Stress and Motivational Interviewing

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14. ABSTRACT

Most veterans with PTSD first present to primary care (versus mental health) because of medical symptoms associated with PTSD (e.g., disrupted sleep). Primary care providers (PCPs) often fail to identify or manage PTSD-related symptoms because they lack training. Few PTSD trainings target PCPs and none provide communication training in techniques like Motivational Interviewing (MI), a non-judgemental, empahtic and active listening style that helps mitigate stigma and motivate engagement in mental health treatment. Previously, our group developed and tested an asynchronous, web-based PTSD training for PCPs which contained pre-recorded clinical vignettes of providers demonstrating assessment and management of PTSD and MI with war veterans. Because the prior training was asynchronous (available any time), it was not difficult for busy PCPs to find time to complete it and it was relatively inexpensive to produce. In a pilot study of the web-based training, among 70 PCPs, PTSD knowledge and perceived self-efficacy improved by the end of the training compared to their baseline scores (Samuelson K, 2013). In addition, PCPs reported that the web-based training was easy to use with few technical problems, yet it lacked interactivity and the ability to practice PTSD assessment and management skills during the training. In the current study, we proposed to develop and test a synchronous Virtual World (VW) training that is more interactive, simulates trauma and PTSD symptoms, and allows PCPs to practice communication skills in assessing and managing PTSD symptoms, including MI. Our overall goal was to build competency among a primary care workforce to better detect and manage PTSD symptoms and motivate treatment engagement in veterans, which may generalize to other populations. Our specific aim was to conduct an randomized controlled trial (RCT) of a Virtual Worlds vs. web-based PTSD training to compare feasibility, acceptability, usability and preliminary efficacy of the two training platforms. Outcomes were collected at baseline, post-training and at 90-days follow-up from participants in both arms and included self-report measures of PTSD knowledge, and self-confidence and self-efficacy in assessing and managing patients who might have PTSD symptoms. We found that the VW PTSD training was superior to the web-based training in several domains measured in the Standardized Patient interviews, but we lacked power to show significant differences with a few exceptions. The Virtual World format had biggest learning gains in MI, shared decision-making, forming partnerships, and expressing empathy. It was relatively less effective in improving PTSD-related knowledge. In sum, asynchronous web-based PTSD training was easier to implement and less costly but preliminarily, was not as effective as an VW immersive experience, particularly in teaching MI, shared decision-making, partnership and empathy. Because VW training is synchronous and new for many learners, it requires time, facilitation, and for many, technical support. This decreases feasibility and usuability, but as computer technology improves, VW educational interventions may become more feasible and important, particularly in teaching more challenging and nuanced clinical skills such as PTSD management and Motivational Interviewing.

15. SUBJECT TERMS

PTSD; medical education; curriculum development; motivational interviewing

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1. INTRODUCTION

Veterans present to primary care providers (PCPs) with posttraumatic stress (PTS) symptoms because many are reluctant to engage in specialty mental health services. Most PCPs have not been trained to assess for and manage symptoms of PTS or motivate Veterans to engage in mental health treatment. This can result in missed opportunities to intervene to prevent chronic mental and physical health problems in War veterans. The project aims are to: (1) iteratively design a new PTS and Motivational Interviewing training for PCPs using Virtual World technology to enhance interactivity compared to online training; (2) implement a robust evaluation including a randomized control trial to obtain a clinically valid outcome measurement; (3) conduct a summative evaluation to inform “scale-up” dissemination and implementation. The project will produce a deliverable that will that has the potential to improve access to PTS assessment and management in primary care for warfighters suffering with PTS symptoms.

2. KEYWORDS

Virtual world; PTSD; medical education; virtual training; curriculum development; motivational interviewing

3. ACCOMPLISHMENTS

Year 1 of the project was dedicated to curriculum development for the Virtual World PTSD and Motivational Interviewing training after obtaining feedback from project stakeholders, i.e., primary care providers (PCPs) through focus groups. The principal investigator, project coordinator, and other co-investigators developed the training curriculum with this input, aligning content with the learning objectives. The vendors, Heyden Ty, reviewed and provided guidance for virtualizing elements of the curriculum to build an engaging and impactful training in a Virtual Worlds environment.

Year 2 of the project was largely dedicated to building the virtual world. The curriculum and content developed during Year 1, were operationalized by our developers at Chant Newall Development Group (CNDG) (overseen by Heyden Ty and the principal investigator). During the virtual world build, the team worked iteratively with the contractors to refine the curriculum and content to optimize the affordances (as well as the limitations) of virtual world technology in accordance with our budget. The research team, vendors at HeydenTy, and developers at CNDG met weekly to review the progress of the build, action steps and project deadlines.

Year 3 of the project was dedicated to completing the virtual world build, working through multiple technical bugs, performing quality checks, and preparing for the randomized control trial (RCT). The team also conducted two focus groups of PCP learners and useful feedback was incorporated in the final product. The virtual world was completed in September 2018 and shortly after was implemented for use in the RCT. In addition, during year 3, we updated the content of the control condition, a web-based training in PTSD assessment and management for PCPs, used in a prior study.

Year 4 was dedicated to conducting the pilot RCT which launched at the end of September 2018. Following a recruitment and enrollment period, four synchronous virtual world trainings were completed. (The web-based control condition was available continuously through an asynchronous learning platform during this period.) CNDG and Heyden Ty assisted our team in making some small revisions (with IRB approval) in an effort to overcome some technical difficulties that occurred during the virtual world trainings. No changes were required to the online training (control).

Year 5 was devoted to completing the two-year pilot randomized control trial (RCT). After enrollment, 99 PCP learners were allocated to the intervention arm (synchronous Virtual Worlds PTSD training) and 101 PCPs were randomized to the control arm (web-based asynchronous PTSD training). Both trainings included Motivational Interviewing as a non-judgemental and affirming communication style to use in the assessment and initial management of PTS in veterans.

Year 6 constituted a no-cost extension year, which allowed us to complete follow-up on all originally enrolled PCP learners (N=200). We recruited and enrolled a greater number of participants than originally planned, because early on, we observed a high drop-out rate due to PCPs' scheduling conflicts and perceived lack of time to participate in research. Post-training data collection periods for both arms of the study concluded on 09/02/2020.

Over the course of the RCT a total of N=31 participants withdrew and N=67 participants were lost to follow-up. For both the intervention arm and control arm, loss to follow-up included those participants who consented but were unresponsive to initial outreach regarding scheduling of study activities. In the intervention arm, the majority of participants withdrew shortly after randomization for the following reasons: they did not own or have access to a computer that could support the virtual worlds program; they could not attend two synchronous 90-minute virtual training sessions; or they lacked

the time to complete the study assessment activities, including standardized patient interviews (see below). Fewer participants withdrew from the control arm. The main reason for withdrawal in the control arm was concern over the time needed to complete participation in the study. In sum, 51 PCPs completing the vitual worlds training and 51 PCP participants completing the control web-based learning condition, which included all follow-up evaluations.

Our team Motivational Interviewing (MI) expert, Jen Manuel, PhD, trained a group of coders at the beginning of 2019 to code recordings of the standardized patient (SP) interviews that were conducted by phone to assess RCT outcomes in particpants from both study arms. The coders were trained to code interviews using the PTS measures, shared decision-making measures, and domains from the Motivational Interview Treatment Integrity (MITI) behavioral coding system. Dr. Manuel held weekly meetings to supervise the coders and ensure standardization in coding. Our team coded 272 SP interviews. Approximately 20% of all sessions (N=54) were randomly selected for double coding. See Table 3 for inter-rater reliability estimates. Coding concluded by the end of October 2020.

Finally, for the summative analysis aim, we recruited and completed qualitative interviews with 22 PCPs to learn about their experiences with the virtual worlds and web-based PTSD training. Of those interviews, N=9 PCPs were from the control arm and N=13 PCPs were from the intervention arm. Interviews were analyzed by two trained analysts using rapid analysis procedures, resulting in an integrated master matrix of identified themes and exemplary quotations and narratives.

a. What were the major goals of the project?

	Timeline (Months)	**Completed**
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Subtask 2: File protocol with VA R&D	1	1
Subtask 3: File protocol with HRPO	1-2	1
Subtask 4: Make any required revisions and resubmit in the above order	1-2	3
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	~~**NCE**~~	
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~~**Subtask 2:** Obtain and analyze VA outcomes data on patient health services utilization~~	~~25-39 NCE~~	~~N/A*~~
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~~**Subtask 4:** Conduct semi-structured interviews with stakeholders from Aim 1~~	~~37-41~~	~~N/A*~~
Subtask 5: Data analysis from Aim 2	42-48 NCE	Complete
Subtask 6: Analyze qualitative aspects of RE-AIM, i.e., adoption, implementation, maintenance. Based on participant feedback in the summative analysis adjusts to the PTS and MI curriculum as well as the VW build will be made.	42-48 NCE	Complete

*Per changes reported on the Y4Q2 and Y5Q2 progress report.

What was accomplished under these goals?

Major Task 1: Obtain local IRB and VA R&D and HRPO Approvals- COMPLETE

Subtask 1: File protocol with Local IRB.
Subtask 2: File protocol with VA R&D.
Subtask 3: File protocol with HRPO.
Subtask 4: Make any required revisions and resubmit in the above order.
Subtask 5: Obtain Local IRB/ VA R&D/ HRPO Approval.

Submitted to and Approved by:
University of California San Francisco Committee on Human Research- 14-15004

- Study Approval (Continuing Review): 03/09/2016-04/05/217
- Amendment 1 (personnel changes): 12/08/2015
- Amendment 2 (personnel changes): 12/21/2015
- Amendment 3 (personnel changes, increased number of SSIVs, interview guide): 03/09/2016
- Continuing Review Approval: 04/26/2016
- Protocol Violation: acknowledged 09/27/2016; Semi-structured interviews were conducted as part of the study's developmental formative evaluation. The subjects (interviewees) are primary care providers at the VA. The protocol states that the interviews are to be conducted via telephone. On July 13, 2016, immediately prior to the interview, the subject requested to be interviewed in person, rather than over the phone. This was a non-veteran subject, a physician on staff at SFVAMC.The researcher complied with the subject's request and conducted the interview in person. The verbal consent process was executed as part of the interview, however, no signed consent was obtained for this incident
- Continuing Review Approval: 04/18/2017
- Amendment 4 (personnel changes): 05/12/2017
- Amendment 5 (personnel changes; administrative changes to the Information Sheet; modification to the recruitment material; addition of a new Interview Guide): 06/09/2017
- Amendment 6 (participant thank you letter): 08/30/2017
- Amendment 7 (personnel changes, recruitment document changes, website text, interview guide): 10/2/2017
- Continuing Review Approval: 03/20/2018
- Amendment 8 (personnel changes, minor changes to study application): 08/09/2018

- Amendment 9 (updated documents required for RCT operations, updated inclusion/exclusion criteria, updated RCT operations on protocol, personnel changes): 09/13/2018
- Continuing Review Approval: 03/06/2019
- Amendment 10 (personnel changes): 04/02/2019
- Amendment 11 (personnel changes, minor changes to recruitment documents): 11/18/2019
- Continuing Review Approval: 02/26/2020
- Continuing Review Approval: 02/02/2021

VA Research & Development and Clinical Research Workgroup

- CRW Approval: 04/22/2015
- VA R&D Approval: 05/07/2015
- VA R&D Renewed: 09/03/2016
- Continuing Review Approval: 03/22/2017

DoD Human Research Protection Office A18590

- Approval: 09/17/2015
- Continuing Review Approval: 04/26/2016
- Continuing Review Approval: 04/18/2017
- Continuing Review Approval: 03/30/2018
- Continuing Review Approval: 07/31/2019
- Continuing Review Approval: 06/26/2020
- Continuing Review Approval: 03/10/2021

Major Task 2: Semi-structured interviews with project stakeholders/key informants to inform curriculum content and instructional design- COMPLETE

- The qualitative team interviewed 14 project stakeholders-providers, healthcare leadership, educational experts and Information Technology (IT) experts.
- The overall conclusions from the developmental formative evaluation included:
  1. Acknowledging challenges in primary care practice related to providing care to veterans with PTSD. Specifically, PCPs struggled to know best practices for management and had limited experience using Motivational Interviewing (MI) as a communication style.
  2. Findings corroborated the need for training PCPs about the assessment and management of PTSD and in MI communication.
  3. Opinions of PCPs about virtual worlds training were limited because they had limited experience with virtual worlds technology for education.
  4. Information from this formative evaluation helped to inform the develop of the virtual worlds training in terms of content and training delivery.

Subtask 1: Recruit & enroll stakeholders/key informants- COMPLETE

- Project coordinator and research assistant recruited and enrolled stakeholders/key informants from a potential pool suggested by the PI and project team.
- Recruitment began in April 2016 and finished in August 2017.

Subtask 2: Qualitative analysis of curriculum content and instructional design- COMPLETE

- Qualitative analyst analyzed semi-structured interview results in relation to the curriculum content and instructional design.

- Content experts from the project team reviewed and offered insight on curriculum storyboards.
- Findings from the analyses of ten interviews were shared in a Technical Report.

Major Task 3: Begin Virtual World (VW) build- COMPLETE

Subtask 1: Designed curriculum based on data from semi-structured interviews- COMPLETE

- Analyzed evaluation data was displayed in a matrix and shared with the curriculum development team to inform the refinement of the training curriculum.
- Storyboards detailing the content for Sessions 1 and 2 of the training were refined and submitted to CNDG. CNDG incorporated findings into the virtual worlds training.

Subtask 2: VW learning environment (initially in Second Life, now in Sinewave)- COMPLETE

- Project team members were oriented to Unity. CNDG hosted team members in an existing learning environment and solicited feedback regarding the characteristics of virtual spaces and avatars to help inform the VW environment they would build for this project during a project-wide meeting on 26-04-2016.
- CNDG submitted a video detailing their progress on 22-06-2016.
- CNDG created a virtual campus, which contained a hospital building with exam rooms for Standardized Patient interviews (for PCPs to practice Motivational Interviewing skills).

Subtask 3: Built an Orientation Center for the VW PTSD training- COMPLETE

- CNDG held several orientation sessions for project staff and collaborators in the virtual world. The Orientation Center environment provides instructions on how to navigate, as well as serves as a test for computer compatibility.
- Orientation completed and is ready for trial initiation.

Subtask 4: Created a storyboard- COMPLETE

- Heyden Ty, our vendor, specializing in virtual learning curriculums, submitted storyboards for each segment of the two-session training on 15-06-2016. These storyboards contained the proposed learner experience for various segments of the training: Exploratorium, Didactic/Lecture, Small Group Standardized Patient Interviews, and Homework. Additionally, they contained content and directions for the engineering experts at CNDG.
- Storyboards were refined to include feedback from the developmental formative evaluation and focus groups.
- The story boards were finalized by Dr. Seal and our consultants.

Subtask 5: Imported and created virtual objects- COMPLETE

- CNDG created a video which presented virtualized elements of the storyboards and curriculum for the project team and principal investigator review. Examples included polling stations, presentation screens, whiteboards for instructor and learner, and click-to-view information posters. They continued to refine the environment based on feedback from the project team.

Subtask 6: Created PCP learner avatar types- COMPLETE

- CNDG created sample avatars for the training, based on the specifications provided to them by the project coordinator.
- CNDG completed the avatar for the main character Alex in the VW PTSD training and up to 36 avatars for the trial participants to choose from and customize.

Subtask 7: Secured the VW environment- COMPLETE

- As sections were completed they were secured, such as the orientation center, main hospital lobby, and rooms for training activities.
- Some areas within the VW continued to be adjusted to optimize user experience.

Subtask 8: Conducted quality checks-COMPLETE

- Quality checks were completed in month 36 and the virtual world training was finalized.

Subtask 9: Migrated to other VW platform (e.g. UNITY)- NO LONGER APPLICABLE

- This subtask is no longer relevant. Before the build started, our developers made the decision to use UNITY through the entire build process. The platform was built and hosted in UNITY so a migration was never required.

Major Task 4: Independent review of completed VW training using a focus group- COMPLETE
Subtask 1: Recruited stakeholders/key informants, including PCPs, who were not involved in initial build recommendations- COMPLETE
- Recruitment for the focus group was completed.

Subtask 2: Conducted Focus Group- COMPLETE
- There was a delay in completing the focus group because the project coordinator left and we had to hire a new one.
- The focus group was completed on October 18, 2017.

Subtask 3: Made revisions based on feedback- COMPLETE
- The qualitative interviewer analyzed and complied the focus group data and presented it to CNDG in month 25. Revisions based on the focus group feedback were made.

Major Task 5: Further refinement of the VW training- COMPLETE
Subtask 1: Recruited independent reviewers for Focus Group- COMPLETE
- Recruitment for the focus group was completed.

Subtask 2: Conducted final focus group to review revisions- COMPLETE
- The focus group was completed with volunteer PCPs (unfamiliar with the project previously) on February 13, 2018.

Subtask 3: Study co-investigators beta-tested the VW training- COMPLETE
- A meeting with the co-investigators to beta-test the training occurred on July 10, 2017

Major Task 6: Refinement of prior web-based training (Control) to update to DSM-V and make it a more apt comparison for RCT- COMPLETE
Subtask 1: Updated content to be consistent with PTS diagnosis in DSM-5- COMPLETE
- With the help of Clinical Psychologists, we revised the curriculum to be aligned with DSM 5 PTS criteria.

Subtask 2: Added simple interactive content- COMPLETE
- We created a PTS case study to add some simple interactive content to the control training.

Major Task 7: Obtained UCSF CME accreditation for the trainings- COMPLETE
Subtask 1: Contacted universities' CME offices and registered as a vendor- COMPLETE
- CME application was submitted and approved at University of California, San Francisco in March 2018. They agreed to provide CME credit to PCPs who participated in the RCT (regardless of arm to which they were randomized)

~~**Subtask 2:** Collaborate with CME offices to host trainings- NO LONGER APPLICABLE~~
- ~~No longer applicable. VW will be hosted on CNDG controlled server allowing for easier access by programmers in the event of any difficulty. We will work with UCSF to ensure that this set-up is compatible with their systems.~~

Major Task 8: Developed battery to assess change in self-reported PTS-related knowledge and clinical skills self-efficacy- COMPLETE
Subtask 1: Developed measure of self-reported PTS-related knowledge and clinical skills self-efficacy (based on measure used in prior pubished trial)- COMPLETE
- Outcomes assessments completed, including demographics, clinical skills and comfort for assessing PTS, knowledge of PTS, feedback on training, and intervention usability.

Subtask 2: Beta-tested online hosting of self-report measures- COMPLETE

- The self-report outcomes assessments were approved by the IRB in month 35 and the data manager implemented the final version into our online data collection program, Qualtrics.
- In month 36, the project manager beta-tested the self-report measures.

Major Task 9: Developed telephone Standardized Patient (SP) Interview to assess relative change in PTS-related competency and MI skills to assess and manage PTS symptoms and to motivate engagement in care – COMPLETE

- Cases were completed for the standardized patients.
- Created a novel PTS-related competency scale.

Subtask 1: Trained the SP actors and calibrated fidelity monitoring- COMPLETE

- The SP actors were trained in July 2018.

Subtask 2: Calibrated the SP assessment instrument- COMPLETE

- Coders trained on the instrument and on the scoring of the SP interviews.

Subtask 3: Calibrated the use of the MITI global rating of MI performance instrument- COMPLETE

- Coderswere trained on how to use the MITI instrument to score the SP interviews.

Major Task 10: Recruitment/Eligibility Screening- COMPLETE

Subtask 1: Developed and refined eligibility screening- COMPLETE

- The eligibility screener was refined by project staff in month 35
- The updated eligibility screener was submitted to and approved by the IRB in month 35.

Subtask 2: Beta tested eligibility link to minimize erros in eligibility screening- COMPLETE

- The project coordinator beta tested the eligibility screener in month 36 and confirmed it was functioning properly.

Major Task 11: Recruited PCPs from VA, DoD, and community- COMPLETE

- We have recruited and enrolled a total N=200 providers and recruitment completed in December 2019.

Subtask 1: Developed recruitment tools (email, e-flyers)- COMPLETE

- The project coordinator created recruitment tools and they were approved by the IRB in month 35.

Subtask 2: Sent email blasts using CME listserves- COMPLETE

- The first email blast went out in September 2018 and the second email blast went out in January 2019.
- Subsequent email blasts went out in October 2019 to attempt to meet our recruitment targets.
- The final email blast went out in November 2019.

Major Task 12: Conducted Enrollment and Informed Consent- COMPLETE

Subtask 1: Verified eligibility requirements- COMPLETE

- We completed an eligibility screen on all 200 participants.

Subtask 2: Assigned subject ID- COMPLETE

- We assigned a unique study ID to all 200 participants.

Major Task 13: Conducted baseline assessments- COMPLETE

Subtask 1: Sent link to baseline survey instrument to all enrolled participants- COMPLETE

- Baseline assessments were completed

~~**Major Task 14: Obtain Patient Outcomes- N/A***~~

~~**Subtask 1:** Make VA data request and clean administrative data- N/A*~~

- ~~This task will occur later in the RCT.~~

~~**Subtask 2:** Obtain and analyze VA outcomes data on patient health services utilization- N/A*~~

- ~~This task will occur later in the RCT.~~

Major Task 15: Randomization- COMPLETE

- Randomization was completed for all n=200 participants.

Subtask 1: Developed stratified block randomization list- COMPLETE

- The block randomization list was completed in month 36.

Major Task 16: VW vs. Control training- COMPLETE

Subtask 1: Conducted VW trainings - COMPLETE

- The training cohorts occurred on October/November 2018, February 2019, May 2019, June 2019, November 2019, January 2020, February/March 2020, and April/May 2020.

Subtask 2: Control training- COMPLETE

.

Major Task #17: Post-training assessment- COMPLETE

- Post-training assessments were completed for PCP participants.

Subtask 1: Beta-tested online hosting of post-training self-report measures- COMPLETE

- The project coordinator beta-tested the post-training self-report measures in month 36.

Major Task #18: Follow-up assessment after a period of 90 days of no contact- COMPLETE

- Follow-up assessments were completed for PCP participants.

Subtask 1: Beta-tested online hosting of 90-day post-training self-report measures- COMPLETE

- The project coordinator beta-tested the post-training self-report measures in month 36.

Major Task #19: Conducted summative analysis- COMPLETE

Subtask 1: Recruited a sub-group of PCPs from each training arm.

Subtask 2: Conducted semi-structured interviews of PCPs across both training arms until thematic saturation was reached.

~~**Subtask 3:** Recruit stakeholders from Aim 1- N/A*~~

~~**Subtask 4:** Conduct semi-structured interviews with stakeholders from Aim 1- N/A*~~

Subtask 5: Completed data analysis from Aim 2.

Subtask 6: Analyzed qualitative aspects of RE-AIM, i.e., adoption, implementation, maintenance. Based on participant feedback in the summative analysis.

*Per changes reported on the Y4Q2 and Y5Q2 progress report.

What opportunities for training and professional development has the project provided?

The providers who participated in the pre-implementation focus groups had the opportunity to learn more about the development of professional trainings in a virtual environment. The providers who participated in the RCT had the opportunity to learn to identify and manage PTSD symptoms in their patients while receiving continuing medical education credit from UCSF. They have also had the opportunity to learn Motivational Interviewing communication techniques that could help them better engage their patients with PTS. The research staff learned, including the project PI and co-investigators gained a deeper appreciation for the complexities and potential pitfalls of creating virtual worlds trainings and by the end had a much more realistic perspective of the scope that could be achieved on a small budget with a relatively short timeline.

How were the results disseminated to communities of interest?

The team presented an abstract at the Society for Academic Continuing Medical Education (SACME) in May 2017 in Scottsdale, AZ on the development of the Virtual World curriculum. In November of 2020, Dr. Seal presented preliminary results from the trial at the International Society for Traumatic Stress Studies, which representas a brioad international PTSD research community. A manuscript is currently in preparation.

What do you plan to do during the next reporting period (currently) to accomplish the goals?

Aim 2 was to implement the pilot RCT comparing the effectiveness of the two training methods (virtual worlds vs. web-based) using pre/post and follow-up Standardized Patient interviews and provider self-report measures. Data collection and analysis is complete. We used linear and generalized linear mixed models to analyze repeated outcome measures (e.g., rating of PCP management of PTS).

Recruitment for Aim 3 completed in November 2020. The data analysis plan for Aim 3 was to use the RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) Implementation Framework to conduct a summative evaluation comparing the outcomes of the two types of PTS trainings. Mixed quantitative and qualitative methods were used to conduct the summative evaluation. Quantitative methods were used to determine “reach”, and application of the training to clinical practice. Qualitative methods were used to summarize and compare subjective features of the trainings such as acceptability and feasibility, barriers and facilitators to implementation in different clinical practice settings, as well as modifications needed to support national scale-up and broader dissemination.

4. IMPACT

What was the impact on the development of the principal discipline(s) of the project?

The project has the potential to make an impact on primary care provider education and continuing medical education relating to the assessment and management of mental health issues in a primary care setting, including posttraumatic stress disorder. The follow-up surveys demonstrated a positive influence in the primary care providers’ assessment of patients with PTS. One provider stated, “I have had several [patients with symptoms suggestive of PTSD] since the PTSD training. I found that the training actually did have a positive effect. In fact I feel that this type of training, often repetitive, is of major value.” Many providers indicated that the virtual training was useful, and specifically, providers reported being to apply the Motivational Interviewing communication techniques covered in the sessions such as reflective listening and other MI skills in clinical practice.

What was the impact on other disciplines?

This is outside the scope of our data analysis, but to the extent that primary care providers build competency in assessing and managing PTS symptoms in primary care setting, presumably more service members and veterans will have access to inial care for their symptoms.

What was the impact on technology transfer?
We successfully developed a web-based and virtual PTS training for primary care providers that others in DoD, VA or outside healthcare organizations are free to use. We extensively documented this virtual world training through photos and video products which will be made available to our sponsor. These can be replicated in other more stable virtual platforms in the future.

What was the impact on society beyond science and technology?

The developmental formative evaluation and focus groups revealed a fair amount of hesitation toward virtual world training for continuing medical education. Several PCPs indicated generational differences in acceptability and ability to navigate and learn in a virtual environment. As the findings are applied to the curriculum and design of the training, the project has the potential to improve public knowledge and attitudes toward virtual world technology for the sake of health care provider education.

5. CHANGES/PROBLEMS

Changes in approach and reasons for change

The license for the platform that hosts our virtual world PTSD training (Sinespace) expired September 30, 2020 after the intervention was completed. We no longer have access to the virtual world training rooms in Sinespace. Maintaining or replicating the environment would require significant additional costs that are outside the scope of the budget for this project. Our team has completed the training sessions with all intervention participants and we have documented the experience with photos and videos which are easily shareable (see appendix).

Actual or anticipated problems or delays and actions or plans to resolve them

- We had difficulty retaining study subjects, who were all primary care providers (PCPs). We attributed this mostly to PCPs having demanding and somewhat unpredictable schedules, making it difficult for them to participate in the Virtual Worlds training. In addition, PCPs across both arms needed to schedule and complete all study assessments including two online surveys and two 30-minute telephone standardized patient assessments, which for some was too burdensome and they dropped out.

- The trial experienced unanticipated delays due to COVID-19. The response rate from PCP participants notably slowed after the start of the pandemic. This negatively impacted data collection from the follow-up assessments in both arms. As a result, we requested a six-month no-cost extension in April 2020 that was approved in June, 2020. This extension allowed us to complete data collection and analysis and we are now preparing an outcomes manuscript.
- The license for the platform that hosts our virtual world PTSD training (Sinespace) expired September 30, 2020 after the intervention was completed. We no longer have access to the virtual world training rooms in Sinespace. Maintaining or replicating the environment would require additional costs that are outside the scope of the budget for this project. Our team completed the training sessions with all intervention participants and we documented the experience with photos and videos which can be made available to others who are interested.

Changes that had a significant impact on expenditures

Nothing to report.

Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents

Nothing to report.

Significant changes in use or care of human subjects

Nothing to report.

Significant changes in use or care of vertebrate animals.

Not applicable.

Significant changes in use of biohazards and/or select agents

Not applicable.

6. PRODUCTS

Books or other non-periodical, one-time publications.

Nothing to report.

Other publications, conference papers, and presentations.

Presentations:

Shershneva, Marianna B., Koenig, Christopher J., Douraghi, Mathew, Sabino, Eilleen E., and K. H. Seal. Using Rapid Qualitative Analysis to Support the Development and Implementaion of a Virtual World Training for Primary Care Providers on Caring for Veterans with Post-traumatic Stress Disorder Symptoms. Society for Academic Continuing Medical
Education's Annual Meeting. May 2017. Scottsdale, AZ.

K. H. Seal. (2020, November). Virtual Worlds Technology to Enhance Primary Care Training in PTSD and Motivational Interviewing for Veterans. Panelist on The Digital Revolution: Harnessing Technology to Enhance Treatment of Trauma-Related Disorders. Virtual presentation. International Society of Traumatic Stress Studies (ISTSS), November, 2020.

Website(s) or other Internet site(s)

A project website focused on recruitment and dissemination of project information was created and was used for the RCT. The website was not renewed following the completion of the RCT. URL: http://pcpsandptsd.com/.

Technologies or techniques

- A virtual world space was built in Sinewave. This virtual world was used to train primary care providers on how to assess and manage PTS symptoms in their patients as well as learn Motivational Interviewing communication skills. The license for the platform expired, however the environment has been documented extensively through photos and videos.
- A set of 5 high-quality web-based video modules were created to train primary care providers on how to assess and manage PTS symptoms in their patients.

Inventions, patent applications, and/or licenses

Nothing to report.

Other Products

There are several other products which are available upon request (some digital file sizes are quite large, i.e., > 100,000 MB) :

- The qualitative team produced a Technical Report for internal use. The report details data collected through semi-structured interviews with PCPs and its relevance to current research in the field of PTS treatment, as well as virtual world education.
- A storyboard representing the overall look and feel of the virtual world environment.
- A didactic for each of the two training lectures in the virtual world. We have included the narration of the didactic which is paired with slides during the virtual world training. These didactics could potentially be used as stand-alone training tools.
- The curriculum for the 5 video modules for the control training. We have included the narration of the modules which is paired with video during the online training. This curriculum could potentially be used as stand-alone training tools.
- The Standardized Patient Actor Training Curriculum for training actors on how to portray veterans with PTS symptoms.
- Six standardized veteran cases that standardized patient actors can use to portray veterans with PTS symptoms when working with primary care providers.
- A new measure to assess for PTS symptom assessment and management skill level in primary care providers.
- Summary of Methods and Results from the pilot trial that are being used in the preparation of the forthcoming manuscript.

7. PARTICIPANTS AND OTHER COLLABORATING ORGANIZATIONS

What individuals have worked on the project?

Project Staff

Name: Karen Seal, MD, MPH Project Role: Principal Investigator Nearest person month worked: 2.4 Contribution to Project: Unchanged Name: Nicole Redden McCamish, MA Project Role: Program Manager Nearest person month worked: 0 Contribution to Project: Complete Name: Allan Chan, BA Project Role: Data Manager Nearest person month worked: 3.6 (donated) Contribution to Project: Unchanged Name: Yongmei Li, PhD Project Role: Statistician/Data Analyst Nearest person month worked: 0 Contribution to Project: Separated from institution Name: Dan Bertenthal, MPH Project Role: Statistician/Data Analyst Nearest person month worked: 3 (donated) Contribution to Project: Replaced Yongmei as Biostatistician for the project. Name: Natalie Purcell, PhD Project Role: Qualitative Researcher Nearest person month worked: 3 Contribution to Project: Unchanged Name: Shira Maguen, PhD Project Role: Co-Investigator	Name: Beth Cohen, MD, MAS Project Role: Co-Investigator Nearest person month worked: 0 Contribution to Project: Complete Name: Linda Abadjian, PhD Project Role: Evaluator Nearest person month worked: 1.8 (donated) Contribution to Project: Complete Name: Brittan McCarthy Project Role: Project Coordinator Nearest person month worked: 6 (donated) Contributions to Project: Complete Name: Greg Reger, PhD Project Role: Co-Investigator Nearest person month worked: 0.6 (donated time) Contribution to Project: Unchanged Name: Standardized Patient Actors (~~Alexander Kinzler~~, ~~Ashley Feuchs~~, ~~Casey Chatman~~, ~~Danny Kwon~~, ~~Dorothy Chen~~, ~~Galina Yudovich~~, ~~Geralyn Glenn~~, ~~Jeremy Judge~~, John Kintner, ~~Kathy Blumenfeld~~, Sarah McGrath, ~~and Valerie Fachman~~) Project Role: Standardized Patient Actors Nearest person month worked: Per Diem Contribution to Project: Complete **Vendors** Name: Chant Newall Development Group Project Role: Consultant

Nearest person month worked: 0 Contribution to Project:Complete Name:Thomas Neylan, MD Project Role: Co-Investigator Nearest person month worked: 0 Contribution to Project: Complete Name: Jen Manuel, PhD Project Role: Standardized Patient Coder and Co-Investigator Nearest person month worked: 1.2 Contributions to Project: Unchanged	Paid by deliverables per the SOW Contribution to Project: Complete Name:Forefront Collaborative Project Role: Consultant Paid hourly on a semi-annual basis Contribution to Project: Complete Name: Heyden Ty Project Role: Consultant Paid by deliverables per the SOW Contribution to Project: Complete

Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?

Nothing to report.

What other organizations were involved as partners?

Nothing to report.

8. SPECIAL REPORTING REQUIREMENTS

Nothing to report

9. APPENDICES

"Improving Access to Care for Warfighters: Virtual Worlds Technology to Enhance Primary Care Training in Posttraumatic Stress and Motivational Interviewing"

Log #JW140067 Award # W81XWH-15-C-0088

PI: Karen Hope Seal, MD MPH **Org:** Northern California Institute for Research and Education **Award Amount:** $1,650,560 Directs + $879,750 F&A

Study Aims

Veterans present to primary care providers (PCPs) with posttraumatic stress (PTS) symptoms because many are resistant to specialty mental health care. Most PCPs have not been trained to assess for and manage symptoms of PTS or motivate Veterans to engage in treatment. This can result in missed opportunities to intervene to prevent chronic mental and physical health problems. We propose to:

(1) Iteratively design a new web-based PTS and Motivational Interviewing training for PCPs using Virtual World technology to enhance interactivity.

(2) Add a more robust evaluation including a randomized control trial for more clinically valid outcome measurement.

(3) Conduct a summative evaluation to inform national "scale-up" dissemination and implementation.

The proposed project is aligned with the needs of JPC 5 (Psychological Health and Resilience) and will produce a deliverable that will improve access to quality clinical care for our warfighters suffering with PTS.

Approach

We are using mixed qualitative and quantitative observational and experimental methods to conduct a 5-year **effectiveness-implementation** randomized controlled trial (RCT), in which project stakeholders participate from start to finish. A formative evaluation consisting of focus groups and semi-structured interviews captures stakeholder input in how we can best design and implement the Virtual World (VW) training. We will then conduct an RCT to compare the new VW training to our prior online PTS training. Pre-/post- and follow-up standardized patient interviews, provider self-report measures, and patient outcomes will be compared between groups. A summative evaluation will solicit feedback of PCP participants and stakeholders to expedite dissemination of the new VW training.

Accomplishment: Beta versions of the learning environment, Orientation Center, avatar types, virtual objects, and key exercises of the training, as described in the storyboards.

Timeline and Cost

Projected Period of Performance and Proposed Direct Costs Per Year

	FY 16	FY 17	FY 18	FY 19	FY 20	FY21
Aim 1 Formative Eval/Design						
Aim 2 RCT						
Aim 3 Summative Eval/Disseminate						
Estimated Costs/Year ($ directs only)	400,000	360,000	229,212	369,056	292,292	

Total Direct: $1,650,560 Directs + $879,750 F&A

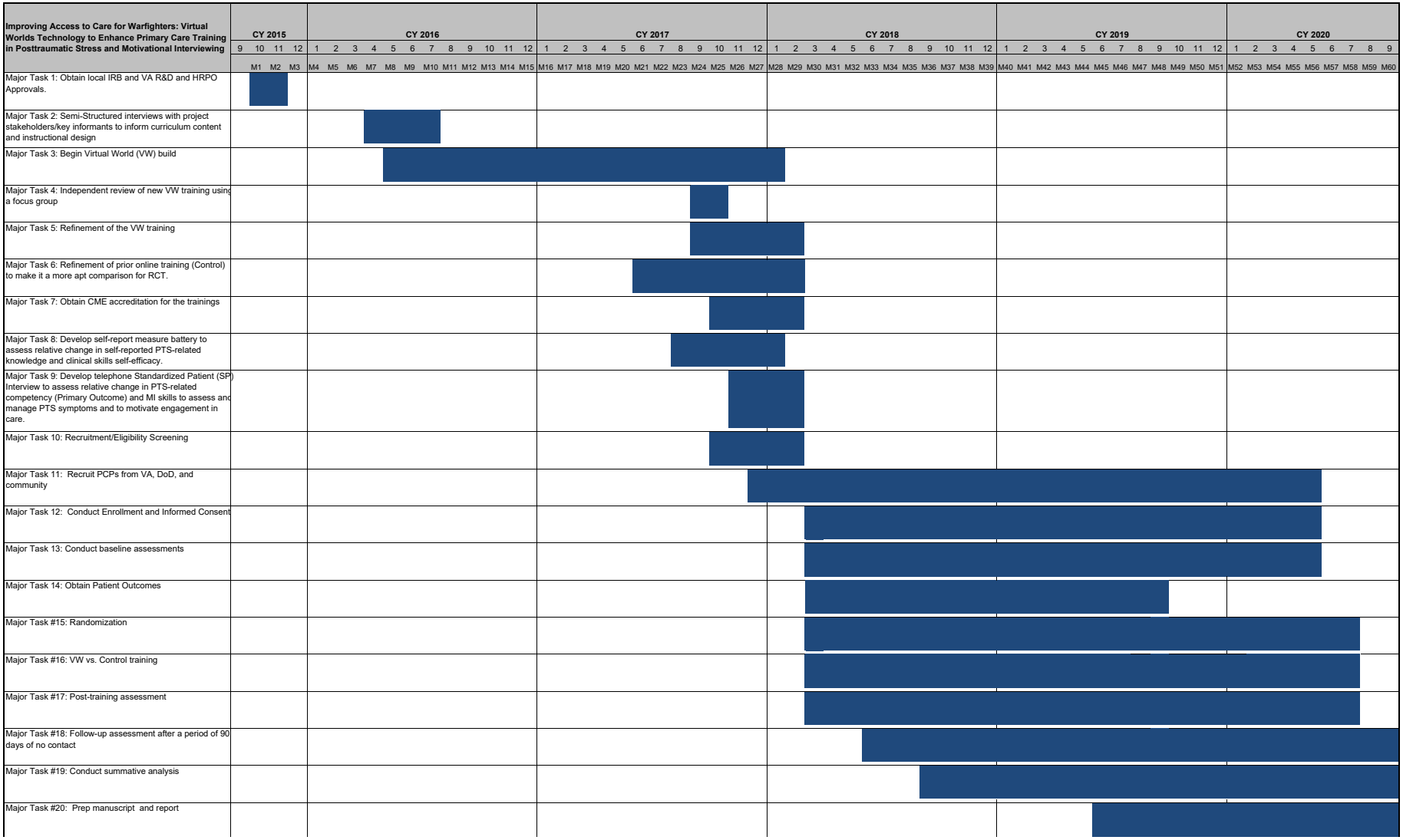
Period of Performance: 09/25/2015-3/24/2021
Updated: 7/22/2021

Goals/Milestones

Major Task 10: Recruitment/Eligibility Screening
Major Task 11: Recruit PCPs from VA, DoD, and community
Major Task 12: Conduct Enrollment and Informed Consent
Major Task 13: Conduct baseline assessments
Major Task 14: Obtain Patient Outcomes
Major Task 15: Randomization
Major Task 16: VW vs. Control training
Major Task 17: Post-training assessment
Major Task 18: Follow-up assessment after a period of 90 days of no contact

Major Task #19: Conduct summative analysis

Budget Expenditure as of 03/24/2021
Projected Expenditure: $1,650,560 Directs + $879,750 F&A
Actual Expenditure: $1,635,325 Directs + $871,628 F&A


Improving Access to Care for Warfighters: Virtual Worlds Technology to Enhance Primary Care Training in Posttraumatic Stress and Motivational Interviewing
CY 2015
CY 2016
CY 2017
CY 2018
CY 2019
CY 2020
9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9
M1 M2 M3 M4 M5 M6 M7 M8 M9 M10 M11 M12 M13 M14 M15 M16 M17 M18 M19 M20 M21 M22 M23 M24 M25 M26 M27 M28 M29 M30 M31 M32 M33 M34 M35 M36 M37 M38 M39 M40 M41 M42 M43 M44 M45 M46 M47 M48 M49 M50 M51 M52 M53 M54 M55 M56 M57 M58 M59 M60
Major Task 1: Obtain local IRB and VA R&D and HRPO Approvals.
Major Task 2: Semi-Structured interviews with project stakeholders/key informants to inform curriculum content and instructional design
Major Task 3: Begin Virtual World (VW) build
Major Task 4: Independent review of new VW training using a focus group
Major Task 5: Refinement of the VW training
Major Task 6: Refinement of prior online training (Control) to make it a more apt comparison for RCT.
Major Task 7: Obtain CME accreditation for the trainings
Major Task 8: Develop self-report measure battery to assess relative change in self-reported PTS-related knowledge and clinical skills self-efficacy.
Major Task 9: Develop telephone Standardized Patient (SP) Interview to assess relative change in PTS-related competency (Primary Outcome) and MI skills to assess and manage PTS symptoms and to motivate engagement in care.
Major Task 10: Recruitment/Eligibility Screening
Major Task 11: Recruit PCPs from VA, DoD, and community
Major Task 12: Conduct Enrollment and Informed Consent
Major Task 13: Conduct baseline assessments
Major Task 14: Obtain Patient Outcomes
Major Task #15: Randomization
Major Task #16: VW vs. Control training
Major Task #17: Post-training assessment
Major Task #18: Follow-up assessment after a period of 90 days of no contact
Major Task #19: Conduct summative analysis
Major Task #20: Prep manuscript and report

Gantt Chart W81XWH-15-C-0088

Improving Access to Care for Warfighters: Virtual Worlds Technology to Enhance Primary Care Training in Posttraumatic Stress and Motivational Interviewing			FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Aim 1 Formative Eval/Design	Major Task 2: Semi-Structured interviews with project stakeholders/key informants to inform curriculum content and instructional design	Anticipated	N=up to 40																			
		Actual			N=14																	
	Major Task 4: Independent review of new VW training using a focus group - Recruit stakeholders/key informants who were not involved in initial build recommendations	Anticipated					N=8															
		Actual									N=3											
	Major Task 5: Refinement of the VW training - Independent reviewers for Focus Group	Anticipated						N=8														
		Actual										N=5										
Aim 2 RCT	Major Task 11: Recruit PCPs from VA, DoD, and community	Anticipated							N=100													
		Actual												N=200								
Aim 3 Summative Eval/ Disseminate	Major Task 19: Conduct Summative Analysis - Recruit PCPs from each training arm	Anticipated													N=20							
		Actual														N=17						
	Major Task 19: Conduct Summative Analysis - Recruit stakeholders from Aim 1	Anticipated													N=10							
		Actual														N/A						

Interviews with Primary Care Providers to Inform the Development of the Virtual World Training on Posttraumatic Stress and Motivational Interviewing

TECHNICAL REPORT
23 October 2016
Data – Not for Distribution

Table of Contents

Background

Military veterans with posttraumatic stress disorder (PTSD) symptoms receive care from primary care providers (PCPs) who often lack basic skills in detecting and managing PTSD and in using effective communication techniques. ***Improving Access to Care for Warfighters: Virtual Worlds Technology to Enhance Primary Care Training in Posttraumatic Stress and Motivational Interviewing*** is a four-year project with the overarching goal to build competency among a primary care workforce to better detect and manage posttraumatic stress symptoms and motivate treatment engagement in warfighters through the use of virtual world (VW) technology. This project consists of development of an innovative VW training for primary care providers (PCPs) and then conducting a randomized controlled trial (RCT) to compare its effectiveness against a traditional web-based course covering similar content. This project is funded as a Joint Warfighter initiative[1] by the US Department of Defense.

This report presents the preliminary results from a developmental formative evaluation, which is part of Phase 1 of the project. The qualitative research team sought to inform the design of the aforementioned VW training through semi-structured interviews with key stakeholders, particularly PCPs, who are the target audience for the training. Contributing researchers include: Christopher J. Koenig, PhD; Marianna Shershneva, PhD; Eilleen Sabino-Laughlin, MPH; and Mathew Douraghi, MA under the guidance of the Principal Investigator, Karen H. Seal, MD MPH. Research activities were approved through the University of California San Francisco Committee on Human Research,[2] VA Research and Development Clinical Research Workgroup, and the Department of Defense Human Research Protection Office[3].

Purpose

This developmental formative evaluation study employs qualitative methods to explore perspectives of PCPs, educators, health care leadership, and information technology specialists on the relevance, acceptability, and feasibility of the VW training. This evaluation is being conducted to solicit input from these stakeholder groups to help shape the intervention content and execution in the VW environment. The research team focused on PCP stakeholders first because understanding their experience with and perspectives on PTSD assessment and management is critical to planning and implementing the VW training modules.

Methods

Study Design

The developmental formative evaluation has been qualitative in nature. Data have been collected using semi-structured interviews and analyzed using rapid qualitative analysis, a collaborative process involving triangulation, iterative data collection and analysis procedures to quickly develop an understanding of a target area from stakeholders' perspectives. Emerging themes from the analysis are being used by the VW instructional design experts to tailor the content and its presentation to the needs, values, and preferences of the stakeholders. This process should facilitate future implementation and dissemination among the project stakeholders.

Sample and Recruitment

A convenience sample of PCPs affiliated with the Veterans Health Administration (VHA) was recruited via e-mail. The e-mail included the study name, a brief "Dear Colleague" message from the study Principal Investigator, Dr. Karen Seal, inviting VA PCPs to participate, and a detailed information sheet describing the study purpose, interview length, anticipated risks and benefits, privacy and confidentiality notices, and participation compensation. Each e-mail solicitation included a link to a YouTube video.[4] This video was created

[1] Award # W81XWH-15-C-0088, Principal Investigator Karen Hope Seal, MD MPH
[2] CHR 14-15004, Interview Guide Approved: 09/03/2016
[3] HRPO A18590
[4] VW video:https://www.youtube.com/watch?v=N_WaUT77LwU&feature=youtu.be

by the VW consultant team to provide an example of a multi-media, immersive VW training environment and to introduce prospective participants, who might have limited experience with VW, to the use of the VW technology for training and education. Interested PCPs were asked to respond to the e-mail solicitation and were scheduled for an interview by the qualitative team.

Data Collection

The research team developed an original semi-structured interview guide based on the senior authors' clinical experience and Drs. Koenig's and Shershneva's experience conducting qualitative research to develop education interventions. The PCP interview guide included questions designed to collect data with respect to four domains: (1) the applicability of training topics for PCPs, including PTSD-related content and MI training; (2) the feasibility and acceptability of a synchronous VW training for busy PCPs; (3) barriers to and facilitators of implementation with regard to learner burden vs. degree of interactivity, internet access, bandwidth and security issues, and preferences for asynchronous training exercises and downloadable provider and patient educational materials; and lastly (4) generalizability for implementation among PCPs in diverse practice settings with different populations.

Ten semi-structured interviews with PCPs, including several clinicians who also had leadership positions in their organizations, were conducted by experienced interviewers, Dr. Christopher J. Koenig and Mathew Douraghi from May to July, 2016. All interviews except one were conducted on the phone and were approximately 30 minutes long. One interview was conducted in-person by the interviewee's request. All participants agreed to have their interviews digitally audio recorded. Data included the audio recordings and interviewer notes taken during the interview. The recordings were retained and used to verify hand-written notes and to identify particularly rich or meaningful participant responses, some of which were selected and incorporated in the rapid analysis.

Interviews with educators and IT specialists will continue throughout intervention development. In the course of the interview, several participants volunteered their expertise and time to examine and evaluate prototypes of the training modules and training intervention.

Data Analysis

The first step of the rapid analysis involved summarizing interviewer notes using a structured template that maps onto the interview guide topics. For instance, immediately after the interview, Mr. Douraghi listened to the audio recording, reviewed notes taken during the interview, summarized the notes into the template, and included verbatim quotations that illustrated particularly rich or meaningful content. Subsequently, Dr. Koenig reviewed the summary and added his notes and comments. Additionally, Mr. Douraghi added the interview recording timestamps next to the key statements to facilitate quick retrieval of the corresponding segment of the recording, if additional data review were needed. Completed summaries were collaboratively reviewed by Drs. Koenig and Shershneva and Mr. Douraghi for accuracy and relevance to the four domains (i.e., relevance, feasibility/acceptability, barriers and facilitators, and generalizability), and by Ms. Sabino-Laughlin (Project Manager) for relevance to intervention development.

The second step involved transferring individual interview content from the original template onto a matrix. Matrix displays are a common rapid qualitative analysis technique to further summarize interview content to identify similarities and differences across participant responses. Particularly rich content was noted on the display to retain participants' concerns in their voices. The evolving matrix display was discussed by the qualitative research team to compare findings across participant groups and identify implications for the VW training content and delivery. Finally, Dr. Shershneva, Mr. Douraghi, and Ms. Sabino-Laughlin presented the qualitative findings in the form of the matrix display to the intervention development team for discussion of themes and implications. Several meetings among the members of the qualitative research team and the curriculum development team resulted in gaining insights into the PCPs' perspectives that helped affirm or modify how the VW intervention modules might be refined to be responsive to stakeholder concerns.

Results

Participants

All study participants were PCPs. They ranged in age and experience, and were located in four different states, with seven located in California, one in Connecticut, one in Colorado, and one in Minnesota. All California PCPs were from the San Francisco Bay Area. Half of the participants were females; 70% (n=7) were physicians and the remaining 30% (n=3), nurse practitioners. All male participants were physicians. The female participants included three nurse practitioners and two physicians. All were affiliated with the VA system, and all had no or limited experience using VW.

Profession	Gender	Age Category	Location	VW Experience
Physician	Male	40-49	California	None
Physician	Male	50-59	California	None
Physician	Male	60-69	California	Limited, not similar to this training
Physician	Female	40-49	California	None
Physician	Male	30-39	Colorado	Limited, not similar to this training
Physician	Male	40-49	Minneapolis	None
Physician	Female	60-69	Connecticut	None
Nurse Practitioner	Female	50-69	California	Limited, not similar to this training
Nurse Practitioner	Female	30-39	California	None
Nurse Practitioner	Female	50-59	California	Limited, not similar to this training

Relevance of Training Topic and Curriculum

Difficulties in Recognizing and Diagnosing PTSD

Half of the interviewees identified that PTSD manifests in different ways and reported the challenge of differentiating PTSD from substance abuse, anxiety, alcoholism, depression, and other mental health conditions. One PCP acknowledged difficulty distinguishing actual trauma from imagined trauma due to dementia or psychosis, and another PCP commended on the difficulty in differentiating PTSD from other mental health conditions, especially in older patients. Below are examples from two interviews:

- “The main challenge is that most of us in primary care, we’re not mental health practitioners. We’re not as experienced with mental health, it’s an issue with training, exposure, and experience. And also a little bit, maybe for some, sometimes if you don’t have enough experience, you’re not comfortable. That would be a main challenge.” (P6)
- “It [PTSD] can feel a little occult sometimes, kind of hidden behind something that looks more like substance abuse or generalized anxiety or alcoholism or sometimes I just won’t get answers during my interview.” (P2)

Several PCPs reflected on the limitations of available screening tools for PTSD, for example saying that four screening questions may not be enough to identify PTSD and that there may be false-negative screening results.

Two PCPs elaborated on difficulties determining the etiology of PTSD in veterans, which may be from a trauma unrelated to active duty, such as a childhood trauma.

A repeated theme in several interviews was: veterans not willing to open up about their mental health problems during visits. One PCP said:

- "I was getting the veteran to acknowledge that they actually have PTSD or symptoms of PTSD. To me, I think, it's the challenge of them, they're in denial. They're in a stage, they're not ready to accept that this could possibly affect them and they could possibly have the diagnosis." (P1)

PCPs explained how veterans are concerned over having a mental health diagnosis in their record because of the stigma and impact on their status in the military.

Other challenges included lack of time to do a mental health-related assessment during a medical visit and the provider failing to recognize that their patient is a combat veteran.

Difficulties in treatment and management of PTSD

The respondents talked about the diversity of veterans with PTSD and other co-morbidities, and acknowledged that it was challenging to determine if some physical symptoms (like itching, etc.) represented a physical manifestation of PTSD. One PCP provided an example of the challenges involved in treating and managing PTSD in homeless people with PTSD who are also substance users.

One PCP commented on how it can be challenging to help veterans see the connection between some symptoms like insomnia due to nightmares and PTSD. Another PCP elaborated on the issue of veterans refusing treatment for PTSD due to the stigma of help-seeking and mental health treatment in general. One PCP felt strongly that medical and psychological management of PTSD can bring relief, but is not sufficient and suggested that many veterans need a more comprehensive solution to addressing their overall health problems and well-being.

Factors influencing PTSD management

Nearly half of respondents (4 of 10) talked about PCPs having insufficient training, experience, or exposure with respect to mental health problems. One PCP noted that VA does not pay for Mindfulness Based Stress Reduction (MBSR) training for veterans.

Other reported factors that can negatively impact PTSD management included:

- Financial and policy factors that limit treatment and prescribing options.
- Socioeconomic factors, including lack of stable housing.
- Not having access to useful screening tools and other tools to help detect mental health problems
- Inconsistent staffing and changes in services may result in veterans receiving inaccurate information about treatment options available to them
- Many providers do not have a way to de-compress after dealing with difficult and emotionally draining patients; this is not a part of the culture of primary care.

PTSD Treatments that PCP Participants Recommend

When asked about treatments they recommend for patients with PTSD, PCPs mentioned multiple therapies (see Table below). Notably, none of the interviewed PCPs reported recommending a community engagement/psychosocial approach.

Treatments Named by PCPs	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**
Medications										
SSRIs (anti-depressant drugs)	X	X			X			X		X
Medication (Prazosin, Flouxetine, Sertraline, Paxil)	X	X		X			X		X	X
Steroid Injections										X
Pain Clinic										X
Behavioral Health										
Cognitive behavioral therapy (CBT)	X						X			
Rapid Processing Eye Movement (EMDR)	X									
MH Referrals		X		X		X		X	X	X
Cognitive processing therapy (CPT)						X				
Evidence based psychotherapy, specifically prolonged exposure therapy (PE)						X				X
Substance Abuse Treatment (AA or NA)		X								

Treatments Named by PCPs	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Community Engagement/Psychosocial Approach										
Community Engagement/Psychosocial Approach										
Mind-Body/Integrative Treatments										
Mindfulness Meditation	X									X
Mantram Repetition, an evidence-based meditation technique tested at VA with HSR&D funding*	X									
Relaxation and joyfulness techniques**		X								
Acupuncture		X		X						X
Chiropractic Care										X
Podiatry										X
Yoga										X
Vet Center Services (Alpha-Stim)	X									
Environmental Factors* **										
Safe, decent, and *beautiful* housing			X							

***** Mantram Repetition is an evidence-based meditation technique adapted to VA by Jill Bormann at San Diego VA. The book "*Strength in the Storm: Transform Stress, Live in Balance, and Find Peace of Mind,*" outlines this practice in detail.
**Possibly, respondent referred to "Acceptance and Commitment therapy"
*** Environmental factors are not necessarily covered in the curriculum

Practice Patterns and Use of Motivational Interviewing (MI) and Shared Decision-Making
Several PCPs elaborated on their practice patterns including communication with patients, a general approach to care for patients with PTSD, and referrals. All but one PCP reported using motivational interviewing (MI) in their practice. One PCP reported having in-depth discussions of treatment options with patients. The same PCP reflected on a holistic approach to care for patients with PTSD. Another PCP reported routinely doing the suicide risk assessments and often referring to a mental health provider, and one PCP reported a preference to leave medication prescribing to a specialist in certain situations, such as in patients having nightmares.

Several interview questions addressed MI. In addition to use of MI in practice, respondents reflected on their MI training experience. Two had no formal training in MI, five participated in MI course(s) provided by various sources, and three were experts in MI as they reported being either a facilitator in MI training or an investigator in an MI training study.

The list below summarizes MI techniques that were identified by the respondents as useful in their practice (using the terms stated by the interviewed PCPs):

- Exploring patient's beliefs, asking them to explain the risks/benefits of a particular behavior, juxtaposing patient behavior with ideal health (three PCPs)
- Reflecting veterans' words, values, and preferences back to them for discussion (three PCPs)
- Open ended questions (two PCPs)
- Affirmations (two PCPs)
- Readiness/confidence ruler (two PCPs)
- Repeating back to veterans what she/he is hearing (one PCP)
- Helping veterans set their own goals (one PCP)
- Expressing empathy (one PCP)

One PCP acknowledged the challenge of knowing what MI technique to use at what time. Other PCPs reported choosing more simple-to-use MI techniques and deciding whether to use MI at all or not based on the relationship with the veteran. One PCP saw the benefit of involving other members of a care team in using MI with veterans, but it was not part of their practice at the time of the interview.

A question about provider-patient shared decision-making was asked in four interviews. Shared decision-making was explained differently by the PCPs, including one appropriate definition of shared decision-making and another definition that likely reflected a misconception about this approach. One PCP noted that shared

decision-making is time-consuming, and one PCP reported lack of skills and confidence necessary for use of shared decision-making.

Suggestions Focused on the VW Training Content
Three PCPs made suggestions related to the proposed training content at various points in the interview. These suggestions are summarized below:

- Include different kinds of trauma—childhood trauma, sexual trauma, other abuse in addition to combat trauma
- Make the training easy to understand and not complicated
- Include information on how fear/anxiety is a driving force for chronic illness; prior trauma might lower the threshold for experiencing fear/anxiety and make these feelings more common.
- Include psychosocial aspects of illness
- Address the concept of forgiveness (i.e., helping the soldiers to recognize that what they are going through is not their fault).
- Include how to express gratitude to veterans for their service to the country.
- Make sure that providers understand that PTSD treatment must be tailored to the individual depending on their symptoms, goals and values and particular life circumstance.
- Address provider secondary "trauma" related to treating patients with PTSD

Training Delivery: Feasibility and Acceptability

Acceptance of Virtual World Training
Half of PCPs reported high acceptance of virtual reality as the proposed training modality, citing that it has the potential to help providers learn and may replace some of the current training modalities in the future. One PCP said:

- "When I watched the video clip, I was pretty amazed because it did pretty much look like a video game and the idea of having simulated patients or even just a classroom in the educational environment, it seems very clever and could be additive or even take the place of some of the training that we get in the medical field." (P7)

Four interviewees believed that the VW training will be well-received by younger PCPs. For example:

- "I think, I'm going to sound old, but I think this is a necessary thing for the millennials and the people who are training now. I think for someone more in the baby boomer-ish era, it would be a little bit more taxing. I found when I looked at the video I thought 'This would be really cool for my kids, but this might make me crazy.' Nobody does anything without a phone these days, including myself, you know people are used to growing up gaming and doing those things and I think that people who are very comfortable in that environment, it would be a fabulous training." (P4)
- "I think it's a generational thing. I think for my generation, I'm almost 55. We didn't grow up with this. So it has been a…, at first I was cynical and now I am much more open." (P9)

Several PCPs noted that a VW training would be convenient, because it is online interesting because of its novelty, and possibly, cost effective. Interactivity among VW users, opportunities to provide immediate feedback, and capability to support simulated patient experience were viewed as positive features of VW. One PCP felt that VW may be used to build a sense of community among providers. Another PCP elaborated on the possibility of converting a face-to-face training into the VW training, and one noted that such training would be good for providers who are new to the VA system.

Four PCPs were skeptical regarding the VW training as they did not see the value of this training modality or considered the VW training to be overwhelming. For example, one PCP questioned the value of the VW training:

- "I guess I'm wondering what is the added value over like some similar like structures like role playing or even, I think things like taping your encounters or standardized patients or something like that. It seems like a lot of effort to create something like that and what is the additional value of that over some of these other things… I'm a little skeptical…I mean I love the idea of supporting primary care doctors in learning more about PTSD and getting more comfortable with it, so if that's a way to make that work." (P8)

Two PCPs felt that audience generation for the VW training would be a challenge.

Notably, interviewed PCPs had no or very limited exposure to VW, and some of their statements revealed misconceptions about VW. For example, one PCP thought that VW participants would need virtual reality goggles to participate in the training.

Suggestions Focused on the VW Training Delivery
Six PCPs made suggestions related to the mode of training delivery which are listed below:

- Make training fun and engaging
- Avoid making this training formulaic as some VA trainings have been in the past
- Make the training similar to previous trainings participants have done
- Make the training user-friendly/avoid technical glitches in virtual environment
- Create modules in 18-20 minute blocks
- Make the training short
- Provide immediate feedback to providers learning new MI skills
- Use case-based learning
- Use a TED Talk format
- Find research to support high information retention rates through this training modality
- Make the training efficient for providers
- Highlight the importance of the training
- Be selective with the initial participants to increase chance of getting positive feedback

Barriers and Facilitators for Participation in VW Training

Facilitators
Several PCPs thought that having dedicated time, in particular, having blocked clinic time would support participation in the VW training. Half of PCPs commented on CME credit, indicating that it is an incentive, but likely not a big draw to participation. Evidence of positive educational impact was viewed as participation facilitator by two PCPs. Two other participants talked about positive feedback and testimonials from participants as factors that may increase future participation. Other facilitators reported by PCPs included relevance to practice; opportunity to learn something new; being able to do training from the VA or at home; desktop computer and mobile access to training; quality improvement credit/incentive; self-paced training; user-friendly/fun to use technology; novelty/technology coolness; non-judgmental environment; training being free; gift card/purchasing VR goggles for participants. One PCP mentioned food, not explaining how this incentive may work in VW.

Barriers
Four PCPs emphasized the importance of finding time for the training, with one PCP also talking about the time to create an account and learn how to use the program. Several PCPs named fear of technology and computer/access problems as the barriers to participation. Additional barriers named by PCPs included resistance because the training is new and different, low satisfaction with previous VA trainings, participant fee, and older age.

One PCP elaborated on the barriers, saying:

- “But it is one of, sort of the very, ‘work-a-day’ barriers of physicians having time in their day to actually having the minutes to participate, having the bandwidth to get an e-mail and actually read it and then track the information that is needed to build the access to the program. What you’re describing, virtual reality seems several generations beyond the current level of functionality of VA related IT. And maybe then, the flip side of that coin is that, it’s exciting and different in a way that really sets it apart from other opportunities for training. I think a real challenge, I imagine VA, it’s been a long time since I’ve read the Scarlett Letter, but that’s what comes to mind for me, you know VA trainings wear a badge of a painful use of 3 hours of your day when you otherwise could be doing other things. I do think a challenge to this will be identifying it as a training related to VA. I think it travels in rough company in that regard.”

Generalizability/Applicability to Broader Audience

When asked about applicability of the described VW training to the broader PCP audience, one PCP stated that such training might not be generalizable because the VA experience is different from the experience in the non-VA settings. Answering the same question, other PCPs offered suggestions for how to make the VW training applicable to the broader audience. Some suggestions overlapped with those for the training content and delivery stated earlier in the report. The suggestions included:

- Include childhood trauma, sexual trauma, abuse, and other types of non-combat trauma
- Reflect the provider's most common type of patients
- Reflect PTSD with comorbid mental health issues
- Include range of patients in age, experience, and treatment options
- Have profession-specific training modules
- Keep the material down to a bare irreducible minimum (BIM) when creating content, then, build off the BIM
- Keep the training relevant with current events in the medical world; be sensitive to the broad range of care issues that PCPs have to deal with each day
- Use a stronger form of training than passive learning
- Vary participant's age ranges for the initial testing group to create ambassadors for the program
- Show educational impact

Discussion

Training on PTSD for PCPs is Relevant and Needed

The interviewed PCPs acknowledged multiple challenges and factors influencing diagnosis, treatment and management of PTSD. Many of these are consistent with findings from prior research. PTSD manifests itself in different ways and frequently co-occurs with other mental health conditions, including a broad range of substance use, mood, anxiety, and personality disorders (Back et al, 2014; Goldstein et al, 2016). Half of participants stated that this presents a challenge because clinical manifestations of comorbid conditions may be similar to PTSD or found to be symptoms of PTSD. As noted by one participant, differentiating PTSD from other mental health conditions is especially difficult in older patients, and it is known that more than 60% of military veterans in the United States are 55 years or older and older age is associated with a higher likelihood of reactivated or delayed-onset PTSD (Mota et al, 2016). Participants also noted that it is difficult to recognize actual trauma from imagined trauma due to dementia, psychosis, and other issues, and recognize the origin of the trauma, which may be trauma related to active duty or trauma caused from other experiences, such as abuse in childhood, adult emotional or sexual trauma.

Participants talked about limitations of screening tools as a challenge, such as false-negative results. It is possible that improved screening instruments will address some of the limitations, as current tools, the Primary Care PTSD screen (PC-PTSD) and the PTSD Checklist, are being examined and modifications are suggested to reflect the new Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria for PTSD (Prins et al, 2016; Spoont et al, 2015). At the same time, implementation of updated screens in routine practice would create additional need for education.

Another challenge reported during interviews was lack of time during a medical visit to do a mental health-related assessment of a veteran patient. This challenge is discussed in the literature. For example, lack of time to deal with psychologic problems was named as a major barrier to PTSD care by 66% of PCPs in a study done by Meredith and colleagues (Meredith et al, 2009)

According to participants, veterans are sometimes unwilling to open up about their mental health problems during the visit with providers and this can increase the difficulty in recognizing PTSD, providing treatment, or referring to treatment. Participants explained that one reason for this unwillingness is a stigma associated with a mental health diagnosis. Veterans express concern over the impact of having a PTSD diagnosis in their file.

This is sometimes tied to concerns over how such a diagnosis will affect their status in the military. Stecker and colleagues (Stecker et al, 2013) studied beliefs of veterans who screened positive for PTSD and found that decision not to seek treatment for symptoms of combat-related PTSD was influenced by stigma in 16% of cases. Beliefs about stigma fell into two categories—including self-stigma and the idea that treatment would result in consequences. This study identified other beliefs that created barriers to treatment, which did not emerge in our formative evaluation. Those included concerns about treatment (40%), emotional readiness for treatment (35%), and logistical issues (8%).

In our formative evaluation, nearly half of participants thought that that PCPs had insufficient training, experience, or exposure with respect to mental health problems. This is consistent with the findings of a survey study of PCPs in community health centers, where PCPs indicated insufficient knowledge about PTSD diagnosis (28% of respondents) and insufficient knowledge about PTSD treatment (27% of respondents) as the major barriers to PTSD care (Meredith et al, 2009). The challenges associated with PTSD care and PCPs' lack of training and knowledge in this clinical area support the relevance and need for the training that is being developed through this project.

Treatments, Practice Patterns and Use of Motivational Interviewing

When asked about which types of treatment they recommend, PCPs overwhelmingly named pharmaceutical interventions, such as anti-depressants and prazosin, a drug for patients with nightmares. Interestingly, the second most popular treatment recommendation for veterans presenting with PTSD symptoms was referral to mental health. While these two approaches are supported by evidence, they both focus on psychological treatments, rather than recommend more integrative treatments, targeting both mind and body.

One surprising finding was that not one of the 10 PCPs mentioned community-based approaches to treatment for PTSD. Developing research has demonstrated that traditional treatments for PTSD have only limited effectiveness. Modalities once thought to be the gold-standard of treatment, such as prolonged exposure therapy, are no longer viewed as such (Neylan, et. al., in publication). Alternatively, a panel of highly specialized physicians recommended engagement in social and vocational activities as a means of not just temporarily alleviating PTSD symptoms, but as a long-lasting method of coping.

Current trends in the VA health care system include a shift to a Whole Health Approach (VA Patient Centered Care website) to care for veteran patients. This involves a personalized, proactive, patient-driven model of healthcare, which is supported by positive relationships between provider and patient. Motivational Interviewing can enhance this relationship and allow PCPs to better understand their veteran patients' values and health goals. Research has shown that patients are more likely to demonstrate readiness for change and are less likely to drop out of interventions in studies where MI was used (Blain 2013).

However, even the most seasoned professionals may not be consistent in utilizing MI in their practice. The interviews revealed a diverse list of MI techniques that were implemented, but also addressed some challenges, such as knowing when to use MI with a patient. Regardless of prior training, PCPs expressed varying levels of comfort with either implementing or recommending certain types of care. This demonstrates a need for the curriculum to, therefore, focus on building the self-efficacy of PCPs to present options to their patients, rather than encouraging PCPs to implement these treatments in their practice.

Opinions About Acceptance of VW Training Varied

Opinions of interviewed PCPs about VW training varied from seeing this format as highly desired for peer PCPs to conservative and even negative opinions about the acceptance and value of education in VW. These opinions should be interpreted with caution because participants lacked VW experience and understanding of VW capabilities. At the same time, participants seemed to be in agreement recognizing the value of interactive educational approaches and feedback, which are recognized as effective continuing education strategies (Moore et al, 2009), and some acknowledged that these strategies can be used in VW. Based on discussions with the VW experts who are the part of the project team, opinions of clinicians who are not familiar with VW are likely to change once they have exposure to the VW training; they may find VW more in-depth and immersive than they originally thought or anticipated.

Several participants speculated that younger PCPs would better accept a VW training than their older peers. It is a common belief that 3D virtual environments are particularly attractive for the younger generation who frequently and naturally use digital technologies in everyday life (Hunsinger et al, 2012). However, multiple studies conducted in different countries suggest that the "digital native" label does not provide evidence of a better use of technology to support learning, because other factors related to learner characteristics and teaching model are also important or more important in this respect (Gros et al, 2012).

An important topic of interest to the research team was how to increase the participant's willingness to engage in the training. When asked about this, participants noted that the training needed to be advertised as fun, exciting, and different from a traditional VA training. More specifically, participants stated that the training should not be formulaic as some VA trainings have been in the past. Collectively, participants named many factors that were either barriers or facilitators for PCPs participation in a VW training. While some of the factors are outside of the education planners' control, such as participants having dedicated time for training, other factors should be addressed by the planners, including access to the training from VA computers, learner support, and mitigating and resolving technical issues, which are to be anticipated (Shershneva et al, 2014).

Implications

Below is a summary of implications for the VW training development and implementation that the research team drew from the analysis of the PCP interview data. Several implications supported the training features that have been planned or considered, such as emphasizing the role of PCPs in PTSD care and resolving issues related to access to training within the VA facilities. Some implications are not specific to the capabilities of VW and reflect the best practices in continuing education, such as use of case-based learning, role-playing, and feedback. The evolving curriculum already includes these elements. By contrast with these elements, some opinions and suggestions from the interviewed PCPs were critically reviewed and not reflected in the list below because they were viewed less relevant to the current training-in-development, such a suggestion to use TED-style presentations. Notably, the emerging results and implications were documented in the matrix table, and evolving versions of the matrix table were shared and reviewed with the PI and the curriculum team to discuss their applicability to the VW training-in-development.

Training development and evaluation:

- Add evaluation questions about perceived complexity of training
- Have a sample of learners that is diverse in age, training, location, etc.
    - Particularly important: should pay attention to age during randomization process for focus groups.
- Review interview notes when recruiting training participants to identify candidates (e.g., P4)

Audience generation:

- Given that some clinicians believe they are using MI in their practice, the audience generation strategies may need to have the language about advancing MI skills rather than introduction to MI
- Advertising should convey precisely what the learner can expect from the training
- Clearly state technical requirements for participation
- Offer CME credit, as it is a desired feature of the training
- Collect (positive) testimonials from VW training participants to use for generation of future audience
- Consider including evidence of the effectiveness of education in VW.Training in the training description/audience generation materials
- Consider presenting training to potential participants as fun, engaging and valuable

Content:

- Reflect in the curriculum that different kinds of trauma may lead to PTS in veterans
- Address community engagement/psychosocial approaches
- Present co-morbid mental health issues
- Include psycho-social aspects of illness
- Discuss disrupted fear networks
- Invest sufficient time in explaining clinical manifestations of PTSD
- Provide learners with downloadable practice-oriented tools and/or links to tools (e.g., tools existing within VA HER/system)

- Demonstrate to learns how best practices in screening for/diagnosis of PTS and managing of patients with PTSD may be time efficient
- Emphasize the role of PCPs
- Reframe the post-traumatic stress symptoms to not imply a “disorder”
- Consider providing a definition of shared decision-making
- For learners from Kaiser and community health care settings: consider providing tips for interacting with veteran patients.

Delivery:
- Revisit IT logistics to ensure VA access to the training
- Create a safe, non-judgmental environment to practice skills
- Provide synchronous training
- Use case-based learning and role-playing
- Support building community among PCPs, provide opportunities for learner-learner interaction and networking
- Provide immediate feedback on learner performance
- Advocate for potential learners to have designated days/times for education in their setting and consider these designated times when scheduling VW training sessions
- Provide learner support to address computer problems
- Involve VA training experts for insight

Generalizability
- Consider the implications for content and delivery stated above as means to increase applicability of the VW training to the broader audience of PCPs
- Consider tailoring the training content to the educational needs and experience of PCPs practicing in the non-VA settings
- Emphasize interprofessional collaborative practice as related to care for patients with PTSD

Limitations

We used a convenience sample of seasoned PCPs affiliated with VA and results cannot be generalizable to the broader population of PCPs affiliated with the VA system and the population of PCPs practicing outside of the VA system. However, generating generalizable results was not the purpose of this study because it was formative evaluation to inform training development and not a research study.

Lack of participant familiarity with VW environment and a choice some participants made to not view the provided video about education in VW prior to the interview led to participant responses based on insufficient or inaccurate understanding of the VW capabilities.

Conclusion

1. Findings about challenges in primary care practice related to providing care to veterans with PTSD as well as treatment choices by PCPs and use of motivational interviewing are consistent with the published studies.
2. Findings support the need for training for PCPs focused on PTSD and MI applied to providing care for patients with PTSD.
3. Opinions of interviewed PCPs about VW training were limited to their insufficient understanding of VW.
4. This formative evaluation generated implications for audience generation, content, and training delivery and evaluation, and training generalizability that are being utilized for the VW training development in this project.

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VA Patient Centered Care Website
http://www.va.gov/PATIENTCENTEREDCARE/explore/about-whole-health.asp

Appendices

Appendix 1: Interview Guide

Before the Interview
Participants will receive background information about the Virtual Worlds project prior to the interview, e.g., curriculum info.

Introduction
[Confirm that participant has received the approved Information Sheet.]

First, I want to thank you for taking the time to talk with me today! The purpose of this brief interview is to get some input from you based on your clinical experience as a primary care provider. Our team is developing a new training intervention for primary care providers to improve their ability to identify and manage posttraumatic stress. While there are other interventions for posttraumatic stress, the one we are planning is interactive and it will be held in an online environment. So, the overall purpose of our conversation today will be to help me understand some of your needs as a clinician around posttraumatic stress and your thoughts about the online environment.

Your participation in this interview is voluntary. You may choose to not answer any question or stop the interview at any time. Do you have questions for me before we begin?

[Recite Audio Consent language from the protocol. START AUDIO RECORDER.]

Domain 1: Needs Assessment of Proposed Training Topics -- Focus on Curriculum
Q1. In your everyday clinical practice, what are some of the challenges recognizing posttraumatic stress (PTS)?

Q2. What are some typical treatments you have recommended for veterans with PTS?
Follow-up: Are there other treatments you have heard about, but don't usually recommend? If not, why not?

Q3: The VA requires PCPs to have basic training in motivational interviewing. Can you tell me about your experience using motivational interviewing?
Follow-up: What have been some of the challenges you have encountered to using motivational interviewing skills in your everyday practice?

Q4. What role has shared decision-making played when selecting treatment for PTS?

Domain 2: Feasibility and Acceptability (Focus on Training Delivery in Virtual World)

One of the things I'm interested in is how interested you might be in participating in a training that is held in an online environment. Did you have a chance to look at the materials I sent before our interview (e.g., the Virtual World introductory module)?
IF YES: The idea behind our training is that participants would log into a virtual environment and conduct the training interactively inside that world.

IF NO: It's no problem if you didn't. Are you at a computer right now? If it's OK, I'll send an e-mail with a link that I'd like for you to click, so I can get your reaction. [SEND LINK]

IF NO, Explain:
A virtual world is a computer-based, 3-D, 360-degree simulated environment. It resembles a first-person computer game, in which the user's digital self (or representation) is free to move around an environment at will, interacting with other people's digital selves and with the objects placed within the environment. A digital self may resemble the user's appearance or may look completely different. Users' digital selves make gestures, move, sit, and interact with the environment in real time. Users can communicate with one another either by speaking through a microphone, or by typing inside a chat

system sort of like an instant message or text. When a user talks, her or his digital self talks, too, and can be heard by other users' digital selves positioned nearby. A virtual environment, which can be anything from a beach to a library, is usually expressed through color- and detail-rich graphics.

Q6. Do you have experience navigating in a virtual world for business, education, or personal reasons?

Q7: From what we have discussed, what do you think about holding a medical education training in a virtual environment?

Domain 3: Barriers and Facilitators

As I mentioned, the long term goal of this project is to better equip providers to work with and treat patients who have posttraumatic stress.

Q8. Do you think other primary care providers would be willing to participate in a training held in a virtual environment?

Follow-up: Can you anticipate possible problems?
Follow-up: Do you have suggestions about how we could make the training user friendly?
Follow-up: Can you think of something that will make the training relevant to busy primary care providers?

Q9. Can you think of some reasons that may prevent a provider from participating in a virtual world training environment?
Q10. Can you think of some reasons that may encourage a provider to participate?
Q11. What about yourself, what might influence your decision to participate in a virtual world training environment?
Q12. Incentives. $$, CME credit, QI credit, etc.

Domain 4: Generalizability

Q12. Providers come from various backgrounds, and our goal is to make sure the training is useful to PCP in various practice contexts. From your experience of doing Continuing Medical Education (CME), what we do to make the training most useful to a broad audience of PCPs?

Interview Ending

Q13. Is there something else relevant to our conversation that I did not ask about, but you would like to share?
Q14. Do you have questions for me?
Thank you for your time!
[STOP AUDIO RECORDER]

Appendix 2: Matrix Table: Interviews with Primary Care Providers (n=10)

Q#	Interview Domain	Implications
DOMAIN 1: RELEVANCE OF TRAINING TOPIC AND CURRICULUM		
Q1	**<u>Difficulties in recognizing and diagnosing PTSD</u>** 1. Having enough time to do MH-related discovery during medical visit (P2, P5) 2. PTSD manifests in different ways; differential diagnosis of PTS with substance abuse, anxiety, alcoholism, and depression other mental health conditions is a challenge (P2, P3, P4, P8, P9) • Difficulty recognizing actual trauma from imagined trauma due to dementia, psychosis, etc. (P3) • Older PTSD patients (P2) 3. Differentiating etiology of PTSD (P1) • Military experience (combat, military sexual trauma; women or men can experience multiple forms of trauma, etc.) • Exposure to other kind of trauma experience (childhood, adult; emotional, sexual, physical, MST, etc.) (P1, P4) 4. Failure by the provider to recognize that their patient is combat veteran (P4) 5. Failure by the provider to understand that veterans don't need to be deployed to a warzone to develop PTSD (P4) 6. Veterans not willing to open up about MH problems during visits (P2, P5, P7) • Veterans will engage in 'deception' when answering questions by answering 'no' to particular questions when the answer should be 'yes'. (P5) • Veterans show concern over having an MH diagnosis in their record because of stigma and impact on their status in the military. (P1, P5) 7. Available screening tool has limitations (P5, P6, P10) • Four question screeners for PTSD that are provided to providers are not enough to capture the entirety of the diagnosis. (P5) • PTSD Screener. (P6) • Negative PTSD screens may not be correct. (P10)	-Reflect in the curriculum that different kinds of trauma may lead to PTS in veterans -Differential diagnosis of PTS is a challenge for PCP. Is there a room in the curriculum to address it? -"Lack of time" is a universal barrier. It may be helpful to demonstrate to the learns how best practices in screening for/diagnosis of PTS and managing of patients with PTSD may be time efficient -Providing learners with downloadable practice-oriented tools and/or links to tools will be helpful - Issue for Kaiser/community PCPs in identifying if the patient is a Vet -Invest sufficient time in explaining tell-tale symptoms. - Emphasize the role of the PCP: not to diagnose PTSD, but rather to manage symptoms of post-traumatic stress to the best of ability Focus Group: We could add evaluation questions about complexity of training.
Q1	**<u>Difficulties in treatment and management of PTSD</u>** 1. Veterans not willing to accept the diagnosis of PTSD and/or refusing treatment for PTSD due to stigma of help-seeking, MH treatment, etc. (P1) 2. PTSD in homeless people who are substance users (P3) 3. Recognize that clinical symptoms may be influenced by/associated with PTSD, such as itching (P1, P9) 4. Getting the veteran to understand that there is a connection between some issues and PTSD (insomnia caused by nightmares caused by PTSD). (P4) 5. Diversity of veterans with PTSD and other co-morbidities (P3) 6. Refusing treatment for PTSD due to stigma of help-seeking, MH treatment, etc. (P1) 7. Medical and psychological management is fine, but does not get at the root of the problem. Medical/psychological treatment is often a temporary band aid, what is	- Communication techniques are important for provider-patient interaction. - Again, explain that PCP's role is not to diagnose. Reframe the symptoms to not imply a "disorder"

Q#	Interview Domain	Implications
	needed for many veterans is a comprehensive solution to solving MH problems. (P3)	
Q1	**Factors influencing PTSD management** 1. Financial and policy factors that play into treatment options/prescribing practices. 2. Social-economic factors, housing (P3) 3. Having useful/useable tools to help discover MH problems (P2) • Ex: IPC initial visit template is a tool that helps to focus on MH for returning veterans (P2) • Suicide Screens/Suicide Risk Assessments (P2) 4. Inconsistent staffing. (P5) 5. PCP's don't have enough training, experience, or exposure to MH. (P6, P7, P8, P9) • Providers coming from outside the VA don't usually have the training to look for PTSD or its symptoms. (P7) • No formal training in recognizing PTSD. (P7, P8) 6. VA does not pay for Mindfulness Based Stress Reduction (MBSR) training for veterans (P3)	-Tools existing within VA HER/system may be utilized in the training -Provide accessible resources for mindfulness -Question: how will we design the screening activity, if not using PC-PTSD screener?
Q2	**PTS treatment participants currently recommend** Medications 1. SSRIs (anti-depressant drugs) for patients with mood components. (P1, P2, P5, P8, P10) 2. Medication (Prazosin, Flouxetine, Sertraline, Paxil) (P1, P2, P4, P7, P9, P10) 3. Steroid Injections (P10) 4. Pain Primary Care Clinic (P10) (this one overlaps: medication, mind-body) Behavioral Health 1. CBT (cognitive behavioral therapy) (P1, P7) 2. ENDR (Rapid Processing Eye Movement) (P1) 3. MH Referrals (P2, P4, P5, P6, P8, P9, P10) 4. Warm handoff or a regular referral to MH 5. Substance Abuse Treatment (AA or NA) (P2) 6. Cognitive processing therapy (P6) 7. Evidence based psychotherapy, specifically long exposure therapy. (P6, P10) Community Engagement/Psychosocial Approach Mind-Body/Integrative Treatments 1. Mindfulness Meditation (P1, P10) 2. Mantram Repetition , an evidence-based meditation technique (P1) • Ex: *Strength in the Storm: Transform Stress, Live in Balance, and Find Peace of Mind* (book) 3. Relaxation and joyfulness techniques (P2)	-Primary care providers use a variety of treatments but are likely to have varying level of comfort with different treatment modalities/agents. (Keep in mind that these are seasoned professionals.) -No community engagement/psychosocial approaches were mentioned by the interviewees. It may be underutilized and should be addressed in the curriculum.

Q#	Interview Domain	Implications
	4. Acupuncture (P2, P4, P10) 5. Chiropractic Care (P10) 6. Podiatry (P10) 7. Yoga (P10) 8. Vet Center Services (Alpha-Stim) (P1) <u>Environmental Factors (not necessarily covered in curriculum)</u> 9. Safe, decent, and *beautiful* housing (P3) <u>Practice Patterns/Approaches to Treatment</u> 1. Does the suicide risk assessments; often refers to a mental health provider (P2) 2. In-depth discussions of treatment options with patients. (P10) 3. Prefers to leave medication prescribing to a specialist in situations such as in patients having nightmares (P1). 4. Holistic approach to care (P10) • Identifying patient's issues, orientating to VA, and getting patients sleeping. 5. Uses motivational interviewing (MI) (P1, P2, P3, P4, P5, P6, P8, P9, P10)	
Q3	**<u>Participants' MI training experience</u>** 1. Participated in MI training (P1, P2, P5, P9, P10) • Courses with VAMC Health Behavior Coordinators (P1, P2) • Center of Excellence in Primary Care Education (COE-PCE) fellowship training (P2) • Participates in various MI trainings. (P5) • Basic MI training (P9, P10) 2. MI expert (P4, P6, P8) • Teaches MI as part of the COE-PCE fellowship program (P4) • Former PI on an MI training project for PCPs. (P6) • Participated and helped facilitate MI trainings. (P8) 3. No formal training in MI training. (P3, P7) 4. No MI training during residency. (P8) **<u>MI techniques participants find useful</u>** 1. Open ended questions (P1, P5) 2. Repeating back to veterans what s/he is hearing (P1) 3. Exploring patient's beliefs, asking to explain the risks/benefits of a particular behavior, juxtaposing patient behavior with ideal health (P3, P4, P5) 4. Helping veterans set their own goals (P4) 5. Expressing empathy (P5) 6. Affirmations (P5, P8) 7. Readiness Ruler (P5, P8)	-Past exposure to MI training does not mean that the clinician uses a *range* of MI techniques or have *advanced* MI skills. -If some clinicians believe they are using MI in their practice, the audience generation strategies may need to have the language about *advancing* MI skills rather than *introduction to* MI. -Think about who the ideal audience is for the training? Green providers?

Q#	Interview Domain	Implications
	• P8 referred to this as a confidence ruler 8. Reflections (P6, P8, P9) 9. Using simplicity when selecting techniques to use. (P10) 10. Would like to bring on other members of a care team into the MI treatment of veterans. (P5) • Participant does not engage in this, but believes it would be a great idea. **Challenges to using MI in clinical settings** 1. Relationship with Veteran determines whether provider will use MI during interaction or not. (P1) 2. Knowing what MI 'tool' to use at what time. (P9)	
Q4	**Shared Decision-Making** 1. Variability in the definition of shared decision-making • Appropriate definition (P2) • Misconception (P1) 2. SDM is time-consuming as it requires equal presentation of options (P2) 3. Lack of skills/confidence necessary for SDM (P4)	-SDM definition may need to be provided to learners (as additional resource?) -Note: A question about SDM was not asked in every interview. (Our focus is on collaborating with patients on a personalized care plan.)
	Suggestions—focus on content **1.** Include different kinds of trauma--childhood trauma, sexual trauma, abuse, etc (P1) **2.** Make the training easy to understand and not complicated (P2) **3.** Include information on how fear is a driving force for illness; trauma lowers threshold for feeling fear (P3) **4.** Include psycho-social aspects of illness. (P3) **5.** Include how to express gratitude to veterans for the service that they gave to the country. (P3) **6.** Make sure that providers understand that PTSD treatment is unique and varies. (P5) **7.** Address provider "trauma" related to treating patients with PTSD (P3) **Related opinions** 1. Many providers don't have an outlet to de-compress after dealing with difficult and emotionally taxing/draining patients. (P8)	-Kaiser/community docs might need tips for interacting with Vet patients. -Easy is subjective term. How do we determine what is easy and what is complicated for multiple participants? For curriculum: Be sure to discuss disrupted fear networks as part of the didactic
DOMAIN 2: TRAINING DELIVERY: FEASIBILITY AND ACCEPTABILITY		
Q6	**Experience with Virtual World** 1. No experience (P2, P3, P6, P7, P8, P10) 2. Limited experience, no similar to the training being developed in this project (P1, P4, P5, P9)	-Providers could come in with the expectation that they know what to do in the environment, but find that it's more in-depth than they originally thought or anticipated.
Q7	**Acceptance of Virtual World Training** 1. Personally: high acceptance, the way to go (P1, P2, P6, P7) • Very clever. Could be additive or even replace current training modalities.	-Our recruitment/advertising should convey precisely what the learner can expect from the training. VW is still unfamiliar for most.

Q#	Interview Domain	Implications
	(P7) • Has potential to be 'incredibly useful' is used for the right reasons. (P9) • Terrific idea with the potential of helping providers learn how to really connect with veterans. (P10) 2. Good delivery method for PCP (P1, P2, P6) • Chance for a higher rate of attendance because it's online. (P1) • Convenient – at own desk, at your environment, etc. (P1, P2) • Interesting/novel way of learning new information; good delivery method. (P2, P6) • May be beneficial and cost effective (P4) 3. Interactivity between users is a positive feature (P4, P6, P7) • You may forget that you're interacting with an avatar (P4) • Values simulated patients capability (P7) 4. Face-to-face training may be converted into the VW training (P10) 5. May be good for providers who are new to VA (P3) • Mentions Ukiah as a clinic with providers who have very little experience (P3) 6. Believes it will be well-received by younger providers (P1, P4, P5, P9) • Could feel too artificial to older generation 7. PCP audience generation for the VW training will be a challenge (P1, P2) 8. May be used to build a sense of community among providers. (P8) 9. Skeptical/negative (P2, P3, P5, P8) • Does not value VW; no particular benefit to this sort of training (P2, P3, P8) • May be overwhelming (P3) • Training modality is boring (P5) **<u>Related opinions</u>** 1. Necessary change. (P4) 2. Curious about educational impact/added value over other educational strategies (P6, P8) 3. Misconception - believes that participant needs virtual reality googles to participate in training (P6) 4. Values PCP learning from each other (P8) 5. Values immediate feedback (P9)	- P4 described in her own words what we call "immersive" -P4 may be invited to be a tester -Clearly stated technical requirements for participation are important -Benefits to synchronous training: • VW may support building community among providers, which was noted to be important by one PCP. PCPs often do not know how their peers practice, what treatment and communication approaches work best in the practice of their peers; therefore, PCPs value opportunities to network and be the part of the community where sharing of experiences occurs. The VW training should provide opportunities for learner-learner interaction. (Think about opportunities for discussion, e.g. homework.) • Immediate feedback is valued - this theme supports the design where learners practice new skills and receive feedback from the facilitators and other learners. -PCPs who are not familiar with VW may be skeptical about education in VW. Their negative attitude may be changed once they engage in education but how to make them choose to participate in the training? -The interviewed PCPs largely represented older/mature providers. It may be useful to have generation mix in the future focus group to receive feedback from younger and older clinicians. Also, can potentially use their "endorsement" of the training as a recruitment tool for the RCT. -Note: providers who are new to VA may not necessarily be younger providers; staff changes may be common on the VA facilities
	<u>Suggestions—focus on delivery</u> **1.** Modules in 18-20 minute blocks (P1) **2.** Use a TED talk format (P1) **3.** Make the training user friendly (P2) **4.** Make the training similar to previous trainings participants have done (P2)	-Feedback on learner performance is essential. -Perhaps cite benefits of VW training in recruitment? -PCPs rely on evidence-based methods. Can we demonstrate evidence via our recruitment tools? -Some suggestions are universal and not specific to

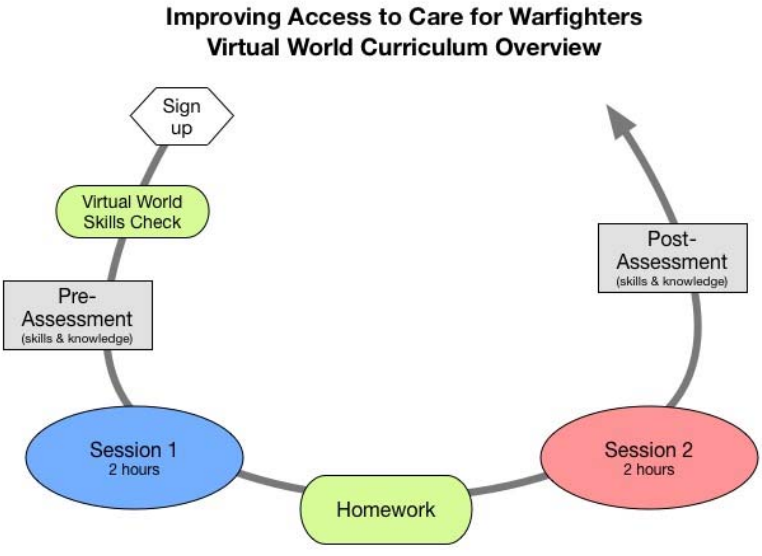
Q#	Interview Domain	Implications
	5. Provide immediate feedback to providers learning new MI skills (P3) **6.** Address concept of forgiveness; helping the soldiers to recognize that what they are going through is not their fault (P3) **7.** Make effort to present training as 'cool', 'fun', 'interesting' and 'valuable'. (P6, P9) **8.** Find research to support high information retention rates through this training modality. (P6) **9.** Avoid 'glitchy' and artificial virtual environment (P6) **10.** Make the training efficient for providers (P6) **11.** Include feedback (P9) **12.** Highlight the importance of the training (P9) **13.** Should not be formulaic. (P9) **14.** Make training short (P10) **15.** Make CME fun and engaging (P10) **16.** Use case-based learning (P10) **<u>Related opinions</u>** **17.** Be selective with the initial participants to increase chance of getting positive feedback (P6) **18.** Role playing is a good training method (P10)	the capabilities of VW, such as case-based learning, role-playing and use of feedback. The evolving curriculum already includes these elements. -Although TED-style presentation is an interesting format to explore in CME/CPD, this format will not be the part of this curriculum -VW is expected to be fun and engaging
DOMAIN 3: BARRIERS AND FACILITATORS		
Q10 Q11	**<u>Facilitators for Participation in VW training</u>** 1. Having blocked clinic time (P1) 2. Having dedicated time (P2, P8, P9) 3. Relevance to practice, such as presenting variety of causes for PTS (P1) 4. Free (P1) 5. CME credit (P1, P2, P4, P6, P10) • CME credit is preferred over QI credit (P4) • Nice but not a big draw (P6) 6. QI credit/incentive that contributes to re-certification (P2, P6) 7. "Self-paced" training (P2) 8. Being able to do training from the VA or at home (P2) 9. Allowing for both desktop and mobile access (P2) 10. Gift card (P6) 11. Purchasing VR googles for providers (P3) 12. Monetary incentive and credit may not mean as much as the opportunity to learn something new (P4) 13. "Mental" age of the provider (P4) 14. Non-judgmental environment (P4) 15. Novelty, technology coolness factor (P6) 16. Easy/user-friendly/fun to use (P4)	-Logistics are key. Perhaps we should speak with VA training experts for insight. -It is important to create a safe environment to practice skills -Dedicated or even blocked clinic time seems to be the critical factor. If potential learners have designated days/times for education in their setting, the planners need to be aware of these scheduled times and, if possible, schedule VW training sessions accordingly. -CME credit may be a desired feature of the training but it is not likely to be the major factor influencing participation -QI theme may reflect VA-specific QI requirements rather than MOC requirements -Collecting testimonials from VW training participants may be helpful for generation of future audience for this training -Training description/front matter may have a reference to the effectiveness of education in VW.

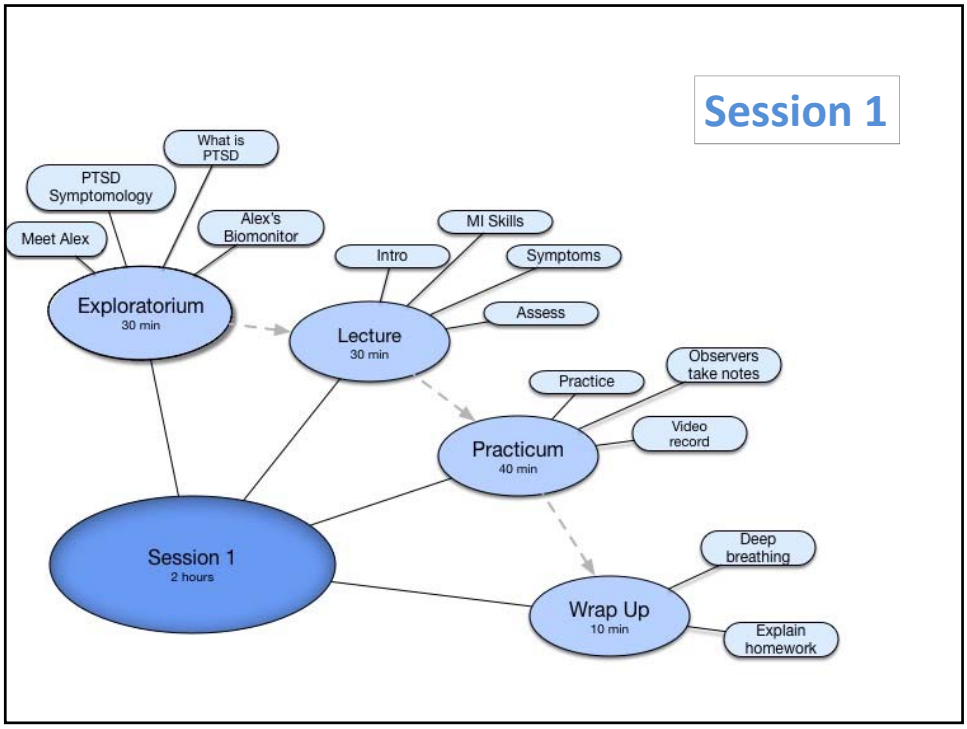
Q#	Interview Domain	Implications
	17. Positive feedback from participants (P4, P6) • Word of mouth advertising among providers (P4) • Testimonials (P6) 18. Food (P6) 19. Demonstrate positive educational impact (P8) 20. Added patient value (?) (P9)	
Q9	**Barriers to Participation in VW training** 1. Resistance because it is new and different (P1) 2. Finding time for the training (P2, P3, P5, P6) 3. Time to create an account and learn how to use the program (P5) 4. Fear of technology (P4, P6) 5. Computer problems (P1, P2) • Not being able to access the training from a VA computer (P2) • Not being able to come back to finish the training (P2) 6. Having to pay for the training (P2) 7. Older age (P4)	-Revisit IT logistics. -VA access to the training is critical
DOMAIN 4: GENERALIZABILITY: APPLICABILITY TO BROADER AUDIENCE		
Q12	**Suggestions for how to make training applicable to broader audience** 1. Include childhood trauma, sexual trauma, abuse, etc. (P1) 2. Reflect a provider's most common type of patient (P2) 3. Reflect PTS with comorbid MH issues (P2) 4. Include range of patients in age, experience, and treatment options (P2) 5. Have profession-specific training modules. (P2, P4) 6. Use stronger form of training than 'passive learning'. (P4) 7. Vary participant's age ranges for the initial testing group to create ambassadors for the program. (P4) 8. Keep the material down to a bare, irreducible, minimum (BIM) when creating content, then, build off the BIM (P9) 9. Keep the training relevant with current events in the medical world (zika, infectious disease, etc.) (P4, P7) • Providers already have to learn about these things and this could make this modality more appealing to them. (P7) 10. Be sensitive to the broad range of care issues that PCP have to deal with each day (P4) 11. Show educational impact (P6) **Other opinions** 1. May not be generalizable the VA experience is different from the experience in the non-VA settings (P2)	-It's important to have a sample of learners that's diverse in age, training, geo., etc. -Training should at least present co-morbid MH issues, if not discuss determining if the patient is facing PTSD vs. other MH issues. - Question: Will learners from outside VA have the same exposure to patients with PTSD? - Necessary to address how different members of a treatment team (varied profession) would approach this? Interprofessional/collaborative practice emphasis. -We should pay attention to age during randomization process for focus groups.

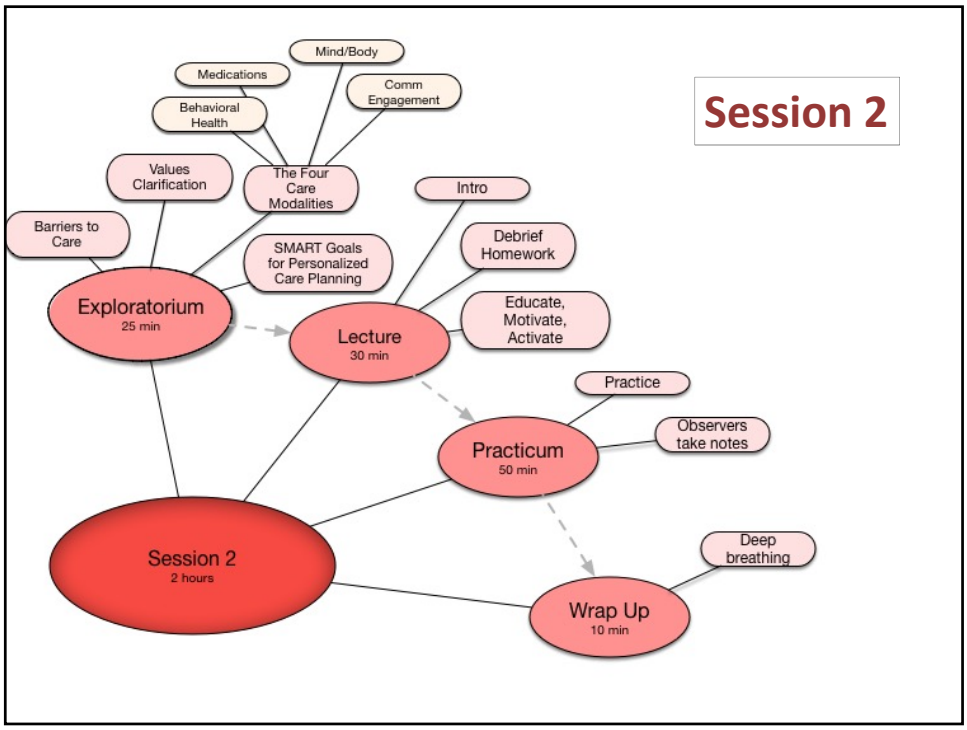
PTSD Project

Overall Notes

9.23.16



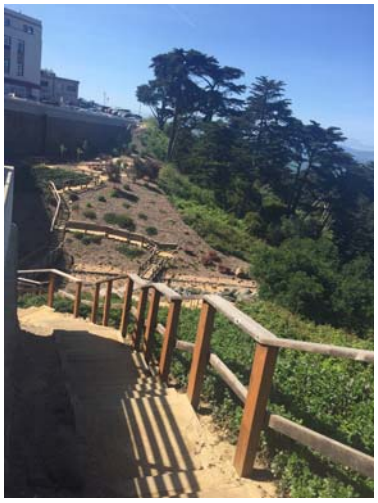

Session 1
What is PTSD
PTSD Symptomology
Meet Alex
Alex's Biomonitor
Exploratorium
30 min
Intro
MI Skills
Symptoms
Assess
Lecture
30 min
Practice
Observers take notes
Video record
Practicum
40 min
Session 1
2 hours
Deep breathing
Wrap Up
10 min
Explain homework


Session 2
Mind/Body
Medications
Comm Engagement
Behavioral Health
Values Clarification
The Four Care Modalities
Intro
Barriers to Care
SMART Goals for Personalized Care Planning
Debrief Homework
Exploratorium
25 min
Educate, Motivate, Activate
Lecture
30 min
Practice
Observers take notes
Practicum
50 min
Session 2
2 hours
Deep breathing
Wrap Up
10 min

Overall Look and Feel Summary

- Location to be reminiscent of the SF VA facility with view of the channel into the SF Bay, greenery, etc.
- Open-air amphitheater, automatic seating for 25 avatars, stage area with screen (for slides) and a back screen for speakers' reference.
- Nearby building that resembles (inspired by?) the SF VA hospital (a large, art deco, stucco building) where the Exploratoriums and the small groups will take place) – see photos.
- Will need some official landing place where everyone enters.

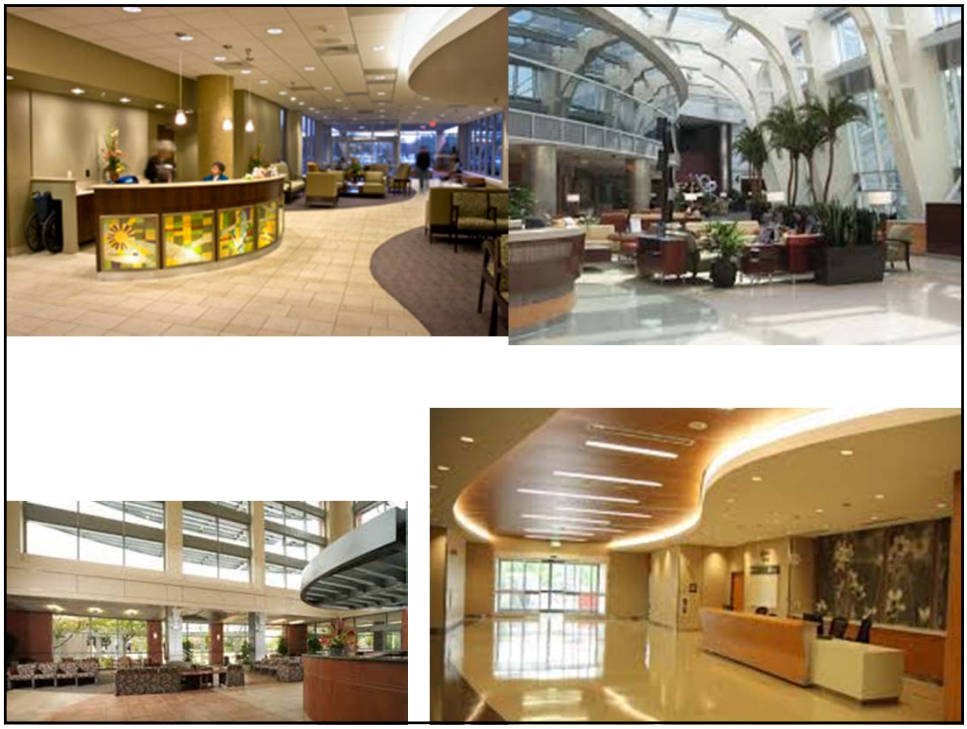
San Francisco Veterans Administration Location



San Francisco Veterans Administration Location

Exploratorium 1 and 2

- Exploratoriums 1 & 2 are located in two separate areas of our hospital lobby.
- The lobby should look like a modern hospital lobby (you can tell you're in a hospital but it's nice – plants, natural light, couches).
- Exploratorium 1 will be available to them upon arrival for session 1 and will remain available. Exploratorium 2 will only be available upon arrival for session 2.
- The two Exploratoria will consist of numbered stations that the learners will explore in numerical order as a group. They can return, asynchronously, to revisit.

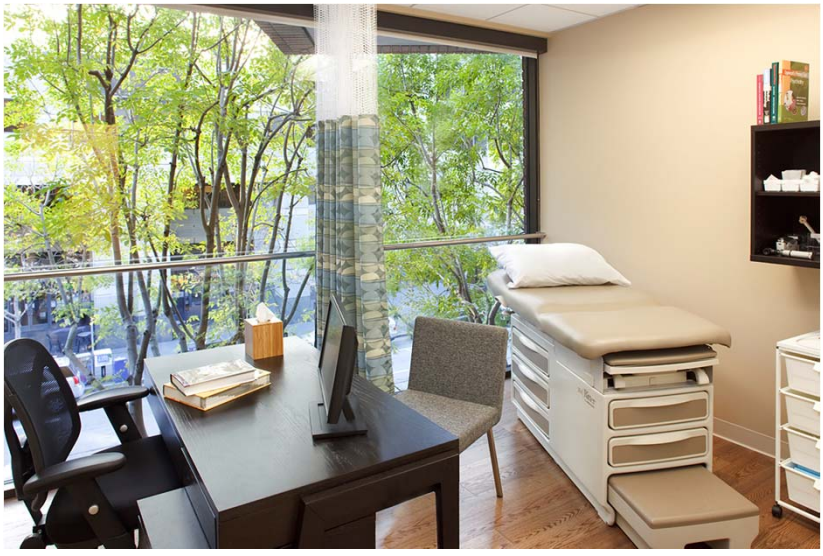


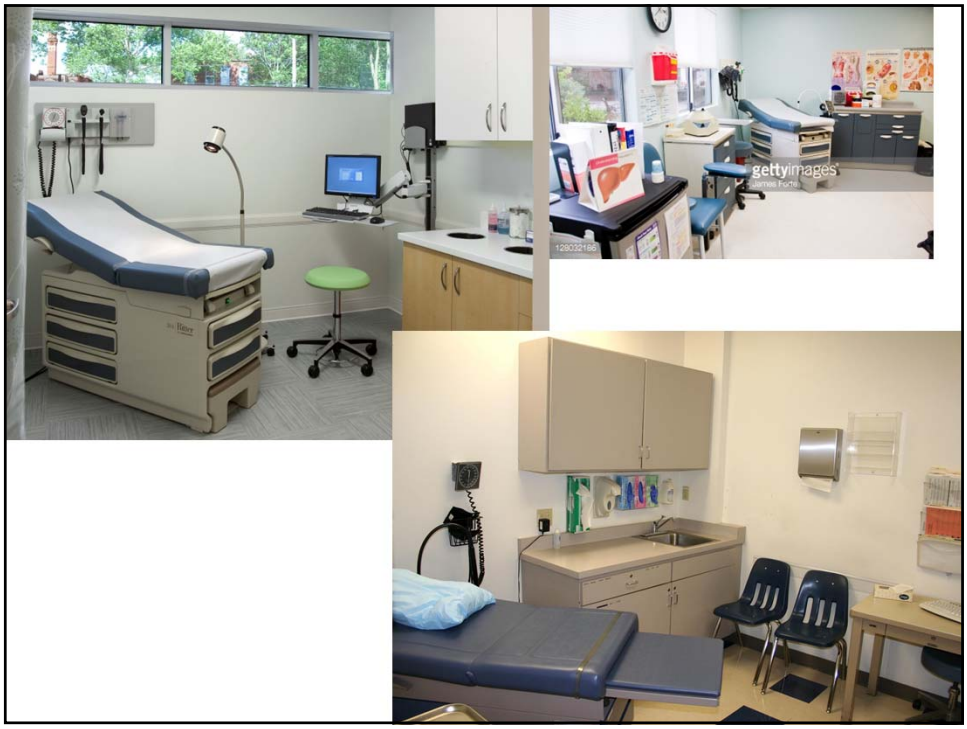
Amphitheater

- Both sessions will include a didactic portion to take place in a spacious and attractive open-air amphitheater.
- Automatic seating for 25 avatars
- Screen for PPT slides
- Reference screen for speakers
- Teleporters easily available to access the small group breakout rooms
- Possible display of completed “boards” from the Exploratorium activities in the amphitheater

Small Group Rooms

- We will have 18 learners at each session, broken into 3 small groups of 6 learners each for the practicum portion of the curriculum.
- After the didactic session, the learners will be teleported to their rooms (all within the "hospital") for the role-play practice to take place in their small groups.
- Rooms should be identified by some easy reference – possibly color (blue room, green room, etc). We will pre-assign avatars to groups/ rooms.
- Each small group room will be an examination room (familiar to our learners) that will include two obvious chairs where the standardized patient and the learner will sit (one by one) to perform their role play. The other learners in the group will also have seating with a clear view of the examining room where the role plays take place.
- Sitting in all chairs should be automatic, on click.
- Place an obvious looking timer for the Small Group coach to keep track of time (8 – 10 minutes per role play).
- Large screen visible that includes the facts of Alex's case that everyone will be using.





Avatars

- Will need 18 avatars for the learners, all looking professional with business casual attire. Three cohorts don't overlap so these avatars can be re-used.
- Mixture of male and female, different skin tones, ages, weight. Women should not be over-sexualized. Provide a healthy mix so the audience looks diverse.
- Also avatars for the presenter, the 3 small group coaches, and ~6 avatars for staff.
- Presenter and coach avatars should have built in animation actions (typical speaker movements).

Homework

- There will be homework for the learners between Session 1 and Session 2.
- All small group interviews will be video recorded and posted (TBD) for review.
- Learners are asked to review their own recording and those of 2-3 others and comment on them.
- Facilitator will debrief the homework at the start of Session 2 didactic section.

What is PTSD?

Posttraumatic Stress Disorder, or PTSD, is a mental health problem with specific disabling symptoms that some people develop after experiencing or witnessing a life-threatening event (American Psychiatric Association, 2013). Examples of stressful life events that do not constitute traumatic events leading to PTSD are: divorce, moving to a new city, starting college, etc. These events may result in other mental health problems like readjustment stress or readjustment disorder, depression or anxiety, but not typically PTSD.

60% of men and 50% of women experience at least 1 trauma (such as an assault or accident, natural disaster, or war) at some point in their lives (National Center for PTSD, 2016). Of those who experience trauma, approximately 4% of men and 10% of women will develop PTSD (National Center for PTSD, 2016). This indicates that while PTSD is prevalent, most individuals exposed to trauma will NOT go on to develop PTSD.

The situation is different for veterans. In VA primary care settings, over 90% of war veterans have experienced at least one traumatic event in their lives either during their military service or pre- or post-deployment (Tanielian et al., 2008). Of these, it is estimated that 30% of Vietnam veterans have experienced PTSD at some point since returning from Vietnam and between 11-20% who served in OIF or OEF have PTSD in a given year (National Center for PTSD, 2016).

Evidence is emerging that there are real physical health effects that stem from PTSD (Cohen et al., 2009; Seal et al, 2011, 2017). Some possible health effects of PTSD include:

- Cardiovascular risk factors (e.g. smoking, hypertension, obesity) and thus vulnerability to heart disease and other medical complications
- Heightened pain perception, lower pain tolerance, chronic pain syndromes, and overuse of opioids
- Increased prevalence of alcohol and substance use disorders

Why Do PCPs need to know about PTSD?

Because individuals with PTSD tend to have higher rates of medical problems and disability than those without PTSD (Jankowksi, 2016), studies have shown that they present to primary care more frequently (Cohen et al., 2010). Indeed, primary care providers are often the first point of contact for patients

experiencing PTSD symptoms, which usually present as physical health complaints such as insomnia, smoking, obesity or other behavioral health problems.

In contrast, relatively few veterans engage in specialty mental health treatment for PTSD symptoms and of those that do, less than 10% complete a full course of evidence-based treatment. (Seal et al., 2010). This is due to multiple barriers to care, some of which are patient factors like stigma, denial and avoidance; others are system-related factors, like shortages of psychologists in rural areas. Some barriers to PTSD care are related to provider factors, including PCPs' lack of familiarity with, assessing for, beginning to manage PTSD symptoms, and making appropriate referrals when needed.

In fact, PTSD is currently under-diagnosed in primary care settings. One study showed that primary care providers successfully identified only 45% of patients who later were diagnosed with PTSD. In addition, many of the patients found to have PTSD diagnoses were not referred by their primary care providers to mental health. (Magruder et al., 2005) This is a real "missed opportunity" because left untreated, PTSD symptoms can contribute to significant functional, interpersonal and occupational impairment and well as overall decreased quality of life.

Thus, when veterans present to primary care for "physical problems," there is an opportunity for primary care providers to assess for and begin to manage PTSD symptoms, if present.

Risk and Resiliency Factors

Following acute trauma, many people struggle with a range of symptoms, including difficulty sleeping, adjusting and coping, but that does not mean that they will or have developed PTSD. Usually, with time, good self-care, social support, and if needed, treatment or counseling, most people recover completely from trauma.

What makes some people develop PTSD while others do not? We are not entirely sure, but we do know that there are certain risk factors associated with higher rates of developing PTSD and certain "resiliency factors" that reduce the risk of developing PTSD after trauma.

In some individuals, the symptoms following trauma do not resolve or get worse, can last for months or even years and can interfere with daily functioning. There are certain "risk factors" that increase an individual's risk for developing PTSD when exposed to trauma (American Psychiatric Association, 2013).

- Genetic predisposition
- Being female
- Less education/lower intelligence
- Prior trauma (especially in childhood)
- Pre-existing co-morbid mental health problems, especially if untreated

Remember though that most individuals exposed to a trauma will NOT develop PTSD. So, it is important to assess for "resiliency factors" (Lauth-Lebens & Lauth, 2016). Resiliency factors may help prevent a person from developing PTSD symptoms in the first place or may be associated with recovery PTSD. Examples of resiliency factors are the following:

- The support of family, peers, and community
- Individual factors such as ability to cope with adversity and self-efficacy

The latter, self-efficacy, is something that we as clinicians can help with by highlighting a person's strengths and prior accomplishments and by communicating positive recovery expectations, namely that the majority of individuals will either NOT develop PTSD, or will recover from their PTSD symptoms over time, either naturally or with treatment.

Learning About PTSD

The diagnosis of PTSD requires that a person experienced or witnessed a traumatic event.
In PTSD, fear signaling to reminders of the original trauma become disrupted leading to a cascade of events.

Experiencing fear during a trauma is a normal and adaptive response. Fear activates the sympathetic division of the nervous system which releases epinephrine and norepinephrine that act on different organs and systems. For instance, there are nearly immediate increases in heart rate, blood pressure and blood sugar, which help us defend ourselves against danger. The release of cortisol from the adrenals is also part of what is termed the "fight-or-flight" response.

In PTSD there is disrupted fear signaling in the brain; however, such that a neutral stimulus, like a car back-firing on a highway in the U.S., can trigger a reminder of the original trauma, such as driving in Iraq and rolling over an Improvised Explosive Device (IED) that resulted in serious injury or death. In this case, a

neutral stimulus like a car-back-firing on a highway in the U.S. triggers what would be considered an *abnormal* response because there is no real threat. Frequent repeated arousal of the sympathetic nervous system in response to neutral stimuli ("trauma triggers") can lead to chronic stress-related physical health problems such as hypertension, obesity, and cardiovascular disease because of increased levels of circulating catecholamines and cortisol.

Posttraumatic stress disorder (PTSD) was first classified as a psychiatric DSM diagnosis in 1980. As with most psychiatric diagnoses, specific criteria must be met in order to make the diagnosis of PTSD. The goal for most primary care providers is NOT to definitively diagnose PTSD, but instead to recognize signs and symptoms in our primary care patients. This will allow us to begin to manage some PTSD symptoms, particularly those with physical manifestations, such as sleep disturbances or substance abuse. It will also help us to talk to some of our patients about pursuing further assessment from a mental health provider, who may be able to provide definitive treatment, if indicated.

The nature of PTSD requires that you, the PCP, adopt a nonjudgmental, empathic approach in the assessment of PTSD symptoms.

PTSD Criteria

Criterion A: The Traumatic Event

PTSD fundamentally requires that a person was exposed to a traumatic event such as death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence.

An example of a question that could assess for a traumatic event in a veteran would be:

- "While you were in Iraq, did you encounter events in which you felt your life was in danger?"

Criterion B: Intrusions

Following a traumatic event, individuals may experience "intrusions" or "re-experiencing symptoms," such as:

- Recurrent and intrusive distressing memories or nightmares about the original trauma.
- Feeling as if they were reliving the traumatic event, sometimes referred to as a "flashback"
- Intense psychological distress or physical reactivity in response to reminders of the event

In working with a veteran, you could ask:

- "Since you returned, have you been bothered by memories or reminders of those events?"
- "What about dreams of the event?"

Criterion C: Avoidance

Following a traumatic event, the following are examples of avoidance symptoms:

- Avoiding thoughts and feeling
- Avoiding people, places, activities or other reminders of the trauma

Questions that can help you assess for Avoidance symptoms are:

- "Many returning soldiers find that they want to avoid thinking or talking about these events. Would you describe yourself in that way?"
- "How about avoiding things, or people, or places that remind you of those experiences?"

Criterion D: Negative Cognitions and Mood

Following a traumatic event, the following are symptoms of negative cognitions and mood:

- Overly negative thoughts
- Blaming oneself or others for causing the trauma
- Dysphoria or depression
- Decreased interest in activities
- Feeling disconnected or detached from loved ones

Examples of questions you might ask are:

- "Have you lost interest in the things you used to enjoy?"
- "Have you felt detached or distant from the people in your life?"

Criterion E: Alterations in Arousal and Activity

Following a traumatic event, the following symptoms represent examples of alterations of arousal and activity:

- Irritability or aggression
- Risky, impulsive or self-destructive behavior, including suicidality
- Hypervigilance
- Heightened startle response
- Difficulty concentrating

- Difficulty sleeping

Here are some questions you might use to probe for these symptoms:

- "Have you been having problems with your sleep since returning?"
- "Do you find yourself being alert and on guard in situations where there is no need to be?"
- "Have you been taking more risks or doing things that might cause you harm?"

Criterion F and G: Persistence and Impairment

Following a traumatic event, the patient's symptoms must be present for at least one month and cause significant impairment in functioning to make a formal diagnosis of PTSD. Please be aware that some veterans or patients who have experienced trauma may have some of these PTSD-related symptoms, but not reach the diagnostic threshold for a formal diagnosis of PTSD.

Instead, they may be suffering from sub-threshold PTSD, adjustment disorder or readjustment stress. Regardless, as a PCP, your focus is on managing the symptoms, not on making a formal diagnosis.

Comorbidity or Differential Diagnosis

There are several mental health problems and some physical health problems that have similar or overlapping symptoms with PTSD. For example, clinicians may confuse symptoms of anxiety, panic disorder, mild traumatic brain injury, and depression with symptoms of PTSD.

Symptoms of these disorders overlap with PTSD, but may also represent distinct or different diagnoses. When confronted with a patient with symptoms of anxiety, depression, or panic, ask yourself:

- Did this patient experience a traumatic event?
- Do they have intrusive or re-experiencing symptoms of the traumatic event?
- Do they display avoidance of people, places and activities that remind them of the trauma?

In other words, if it is posttraumatic stress disorder, symptoms relate back to the original trauma, whereas in these other disorders, the symptoms do not refer to a particular traumatic event.

It is also important to bear in mind that these diagnoses, like depression, anxiety, substance use disorders etc. may co-occur (or be comorbid) with PTSD. In fact, PTSD rarely occurs in isolation. It is more commonly comorbid with other mental and physical health disorders, like depression, TBI, chronic pain, and substance

use disorders as some attempt to self-medicate untreated PTSD symptoms (National Center for PTSD, 2018).

Screening for PTSD

Assessing for PTSD can be challenging even for trained mental health clinicians because one of the hallmark symptoms is avoidance. Avoidance may manifest as avoiding thoughts, feelings or conversations about the trauma, as well as, detaching from others, making it challenging for patients to engage with you. In addition, there may be stigma associated with disclosing mental health symptoms. The diagnosis is often missed because patients do not volunteer information about traumatic histories or other symptoms they may be experiencing. For this reason, standardized screening instruments can be helpful and a jumping off point.

The brief 5-question Primary Care PTSD screen can be a useful tool to start with. This screen has been found to be reliable and valid when compared with lengthier, gold standard, assessment measures (Prins et al., 2016). The screen was originally developed by the National Center for PTSD and is used by the Department of Veterans Affairs to screen for PTSD in all veterans who have returned from combat and at least once a year thereafter.

Endorsement of 3 of the 5 symptoms is highly sensitive for a presumptive PTSD diagnosis. Note, this is only a screen and thus if the Primary Care -PTSD screen is positive, further evaluation for PTSD diagnosis and high-risk behavior, such as suicidality, is warranted.

Communication Around PTSD

Now let's turn our attention to *how* we assess for and communicate concern around possible PTSD symptoms. In truth, our approach and communication style can mean the difference between a veteran's engaging in care and recovering or continuing to suffer in silence in a downward spiral. For a combat veteran who has been trained to just suck it up and keep moving, opening up about vulnerabilities can be risky, create stigma and shame, and for most veterans, goes against their military training. Your role can be providing the safety net for them to open up, normalizing PTSD-like symptoms ("you are not alone"), affirming that by sharing their symptoms, they have taken the first step toward recovery, and inspiring them with the hope that effective treatments are available.

An effective communication style is known as Motivational Interviewing, or MI. There is a simple pneumonic, "OARS" that can help you remember the conversational elements of MI that facilitate positive, empathic communication, especially in situations in which there can be stigma around symptoms, like in PTSD. OARS stands for:

- ***"O"*** for asking open-ended questions that allow patients to more fully express themselves, without feeling rushed or otherwise shut down.
- ***"A"*** for affirmations, in which the provider makes supportive statements after patients disclose personal or sensitive information about their symptoms, for example, "that must have been hard for you to talk about."
- ***"R"*** for reflective listening, the provider essentially repeats back what patients just said, sometimes with a curious tone: "So you are waking up with nightmares nearly every night?" And then maybe the short affirmation, "That must be really rough...," and pause. This gentle probe and pausing encourages patients to elaborate, providing more information, especially when it is hard for them to talk about something, like specifics about what makes symptoms better or worse.
- ***"S"*** for summary in which the provider essentially puts the pieces of information together for patients and then checks in with them about whether they correctly understood. This not only demonstrates that the provider is listening attentively and respectfully, but also can encourage even more elaboration from patients about what is really going on.

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Barriers to Care and Motivational Interviewing

Motivational Interviewing (MI) techniques and principles can be particularly helpful in overcoming some barriers to mental health care experienced by combat veterans suffering from symptoms of PTSD (Seal et al., 2012).

Individuals with PTSD might have to overcome barriers when trying to get care for their mental health problems. Typically, individuals with PTSD are reluctant to seek out or accept referrals for mental health treatment. They may feel shame about the traumatic event because they are trained to be warriors and to "suck it up." There can be stigma about accepting treatment because they fear they may be perceived as "weak" or that it may negatively impact their careers (Cheney et al., 2018). Sometimes they are in denial that their symptoms and behaviors are actually problematic. They may feel that a behavior, such as vigilance, something they learned to perfect in the military, is protective and therefore they may be reluctant to engage in therapies that focus on decreasing hypervigilance (Harpaz-Rotem, Rosenheck, Pietrzak, & Southwick, 2014). Individuals with PTSD are often avoidant of reminders of the event, and don't relish talking about traumatic memories in therapy, which may keep them from fully engaging.

Studies have shown that Motivational Interviewing can help overcome barriers to mental health care, particularly in combat veterans (Seal et al., 2012). For instance, MI supports a person's autonomy, putting the combat veteran in the driver's seat with regard to decision-making. Using MI, PCPs can remind patients about their strengths or changes they have made in the past, thereby supporting their self-efficacy in making new behavioral changes, which may start with engaging in therapy. We have already discussed the importance of expressing empathy instead of judgement, which allows individuals to feel comfortable and accepted. In MI, when there is resistance, it's best to avoid entering into struggles with patients, but simply acknowledge the resistance with a reflection or open-ended question that allows the individual to explore their resistance in greater depth. This can help clinicians start to develop "Discrepancy", also an MI technique: What patients like about the current behavior, but also how this behavior may not align with their vision of themselves or their current values and goals for their lives.

Multimodal Care for PTSD

Something we have learned over the years in working with veterans with mental health problems is that veterans want to engage in mental health treatment on their own terms and there is no one-size-fits-all approach. It must be personalized for veterans to initiate and stick with treatment.

National guidelines advise that PTSD treatment is most successful when pharmacotherapy is combined with behavioral health treatments, but a recent Cochrane review suggests that more research is needed in this area (Hetrick, Purcell, Garner, & Parslow, 2010). Recent smaller studies suggest that complimentary and integrative health (or mind-body) approaches and positive engagement in activities based on one's values may also be helpful in the treatment of PTSD (Steenkamp, Litz, Hoge, & Marmar, 2015).

Evidence Base Psychotherapies for PTSD

There are several evidence-based, trauma-focused psychotherapies for PTSD usually requiring 9-12 sessions. Three of them, Prolonged Exposure Therapy (PE), Cognitive Processing Therapy (CPT) and Eye Movement Desensitization and Reprocessing (EMDR) are distinct forms of Cognitive Behavioral Therapy. These therapies focus on the original trauma, and for this reason are also known as "trauma-focused" therapy as opposed to present-centered therapies, which focus more on learning coping strategies (e.g., stress reduction) in the present. Each of these treatments involve slightly different ways of extinguishing abnormal fear responses to neutral stimuli (e.g., car back-firing) that have become paired with the original trauma (e.g., IED explosion).

The trauma-focused therapies begin with education about PTSD and awareness of the power of trauma reminders and triggers. Each treatment involves learning relaxation techniques that can be used when reminded of the original trauma. In Prolonged Exposure Therapy and Cognitive Processing Therapy, patients either write or recount their trauma narrative over and over again employing relaxation techniques and/or learn to change negative beliefs about the trauma until the trauma loses its grip over the individual. EMDR asks patients to attend to emotionally disturbing material within the trauma in brief sequential doses while focusing on an external stimulus, typically therapist-directed lateral eye movements. Additionally, EMDR can involve identifying an aversive cognition associated with the trauma, and then identifying an alternative positive cognition to replace the aversive cognition. All trauma-focused therapies involve habituation to the fear response.

In randomized controlled trials, trauma-focused therapies have been found to be the most efficacious therapies for PTSD symptom improvement (Norman, Hamblen, Schnurr, & Eftekhari, 2018). However, they are very challenging for patients to endure and many patients drop out before the treatment is completed Seal et al., 2010; Hoge et al., 2014). A recent meta-analysis suggests that the trauma-focused therapies may have similar efficacy to present-centered therapies (Steenkamp, Litz, Hoge, & Marmar, 2015). PCPs can be

instrumental in encouraging not only initiation of psychotherapy, but also retention in treatment, by using techniques such as Motivational Interviewing.

As primary care providers, you need not become proficient in any of these psychotherapies. Instead, it is important for you to know when to refer and to be able to explain the underlying premise of the treatments to patients. In many cases, PTSD symptoms may become worse before they become better. Motivational Interviewing can be used to not only encourage initial engagement, but also retention in therapy.

Pharmacotherapy for PTSD

Pharmacotherapy is an important option in the treatment of PTSD because a number of neurobiological mechanisms may be disrupted. It is important to acknowledge; however, that medication alone is effective for PTSD symptoms in only 60% of individuals (Stein, Seedat, van der Linden, & Zungu-Dirway, 2000).

In the past, PTSD was managed with benzodiazepines. Subsequent research has shown that benzodiazepines have NO EFFECT on core PTSD symptoms (Braun et al., 1990). Also, caution must be exercised when prescribing benzodiazepines as they are habit-forming and when combined with other CNS-depressant medications, a potent risk factor for overdose. Regardless, many patients remain on benzodiazepines for PTSD, which can be a risk for overdose, especially if the patient is also receiving opioids for chronic pain or abuses alcohol.

The strongest evidence to date has been for the use of selective serotonin re-uptake inhibitors (or SSRIs), which have demonstrated efficacy in reducing PTSD symptoms and producing global clinical improvement. As such, they are the most effective FDA-approved medications for PTSD to date (Jeffreys, 2018). Much of the SSRI information provided below, you are probably familiar with for the treatment of depression. It is similar for PTSD.

SSRIs are also effective treatments for the following conditions which often co-occur with PTSD:

- Depression
- Panic disorder
- Social phobia
- Obsessive-compulsive disorder

SSRIs are also effective in reducing symptoms associated with PTSD, such as:

- Rage
- Aggression
- Impulsivity
- Suicidality

Sertraline and Paroxetine are the only FDA approved medications for the treatment of PTSD, although many other SSRIs are commonly used (Jeffreys, 2018). Research has shown that SSRIs are more effective when used at full doses and maintained for 12-18 months.

Bear in mind the possible side-effects of SSRIs including:

- Insomnia
- Restlessness
- Nausea
- Decreased appetite
- Daytime sedation
- Anxiety
- Sexual dysfunction

If the side effects of SSRIs are not tolerable to your patients or PTSD symptoms or comorbidities are refractory, consider referring to a psychiatrist for assistance or you could consider alternative options. Venlafaxine or Duloxetine (serotonin norepinephrine re-uptake inhibitors, or SNRIs) can be used for treatment-resistant PTSD and for co-morbid chronic pain, especially neuropathic pain. Bupropion can be used when sexual side-effects are a problem.

PCPs can also manage specific symptoms of PTSD. For example, medication options for the treatment of insomnia include: low dose trazodone, short-acting non-benzodiazepine (e.g., Zolpidem), or Melatonin. Be aware that with zolpidem there may be parasomnias and daytime somnolence. Melatonin can be a good option and it is also over the counter. Medications for sleep disturbances related to PTSD are more effective in combination with sleep hygiene and relaxation techniques or even short-term cognitive behavioral therapy for sleep (Schoenfeld, Deviva, & Manber 2012).

Research has shown that the alpha-blocker, prazosin, slowly titrated up (to max dose of 15 mg qHS) may reduce nightmares related to PTSD intrusions (Raskind et al., 2002). Warn your patients who are starting prazosin about the possibility of orthostasis and subsequent falls.

Complimentary and Integrative Health for PTSD

Evidence is emerging for the use of complimentary and integrative health modalities in the treatment of PTSD. Specifically, there is limited evidence for meditation, yoga, and acupuncture in decreasing symptoms of PTSD. (Engel et al., 2014; Niles et al., 2012; Mitchell et al., 2014) These therapies may reduce stress and have other health benefits alone or when combined with either medication, psychotherapy, or both, and may contribute to a multi-modal PTSD treatment plan.

Values Based Engagement

Often patients with PTSD find it difficult to engage in or stick with therapy and there is a growing consensus that evidence-based trauma-focused therapies might not be the best option for everyone. (Steenkamp, Litz, Hoge, & Marmar, 2015) However, there's a fourth category you could consider- we are calling it "engagement in valued activities."

Using Motivational Interviewing, PCPs can help their patients identify what they value most and then encourage them to engage in activities that promote those values. You can help your patients articulate their strengths, remember their past successes, and encourage engagement in positive behaviors or activities. For example, a father who used to love playing baseball might consider volunteering to coach his daughter's softball team. You might recognize this as Acceptance and Commitment Therapy (or ACT), which is being studied for the treatment of PTSD, and where evidence currently exists for depression and chronic pain (Bohlmeijer, Fledderus, Rokx, & Pieterse, 2011; Vowles, McCracken, & O'Brien, 2011). This approach allows patients to move forward in their lives, not wait to feel better before they take action.

Personalized Care Planning

In considering a multi-modal treatment approach to PTSD treatment, we can begin to develop a Personalized Care Plan for our patients.

The first step involves asking them what matters most to them, what some of their "bigger picture" life goals are and what specific steps they can take now toward achieving those goals. It is helpful to clarify what a goal is with your patients, specifically pointing out that a goal is NOT something they are already

doing, but something that requires them to reach or stretch. Remind them that you and others in their lives are there to help.

Creating SMART Goals

In the term SMART, the "S" stands for Specific because if the goal is not well-defined, it will be hard to implement and measure. The "M" stands for Measurable; it is important for the patient and you to be able to measure progress toward goals. The "A" stands for "Attainable" because you never want to set the bar so high that patients feel frustrated and give up. The "R" stands for "Results-focused" because it is helpful for patients to experience the fruits of their labor, which helps to build confidence and self-efficacy. "T" stands for "time-focused" because stating when and how often an activity will occur further defines the goal and creates greater accountability.

SMART goals are not the "big picture" life goals like climbing Mt. Kilimanjaro, but smaller, interim goals that will need to be accomplished on the way to achieving the larger life goals. For example, in the case of the larger goal of climbing Mt. Kilimanjaro, an interim SMART goal for someone who is not currently exercising may be to start walking at least 30 minutes 5 day a week.

Now, let's return to Alex, our veteran with PTSD symptoms, and review the Personalized Care Planning Process that you worked on in the Modalities to Care room.

In creating a SMART goal for a patient, first, recall some of the patient's PTSD-related symptoms and related problems. Second, inventory the patient's values and life goals by asking him/her the simple question of "What matters most? What do you want your health for?" Third, remember the multi-modal care options for managing PTSD symptoms and consider which options might both alleviate the patient's symptoms and bring the patient closer to achieving some of their life goals. The four modalities we discussed for the treatment of PTSD were medication, behavioral therapies, complimentary and integrative health modalities, and values-based activities.

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Why is PTSD Important?

60% of men and 50% of women experience at least 1 trauma (such as an assault or accident, natural disaster, or war) at some point in their lives. Of those who experience trauma, approximately 4% of men and 10% of women will develop PTSD. (National Center for PTSD, 2016)

90% of veterans have experienced a trauma and rates of PTSD are higher than in the civilian population (National Center for PTSD, 2016). It is estimated that 30% of Vietnam veterans have experienced PTSD at some point since returning from Vietnam (National Center for PTSD, 2016). Many veterans experience clinically significant symptoms without meeting PTSD diagnostic criteria. (Pietrzak et al., 2012)

Evidence is emerging that there are real physical health effects that stem from PTSD (Cohen et al., 2009; Seal et al, 2011, 2017). Some possible health effects of PTSD include:

- Cardiovascular risk factors (e.g. smoking, hypertension, obesity) and thus vulnerability to heart disease and other medical complications
- Heightened pain perception, lower pain tolerance, and chronic pain syndromes
- Increased prevalence of alcohol and substance use disorders

Why do PCPs Need to Know About PTSD?

There is a great need for primary care providers (PCPs) to detect PTSD symptoms for the following reasons:

- Few veterans seek out specialty mental health treatment for PTSD. Of those who have sought specialty mental health treatment, less than 10% have completed the number of sessions necessary to approximate evidence based PSTD treatment. (Seal et al., 2010)
- In contrast, veterans with PTSD have higher rates of medical problems. A higher proportion of veterans with PTSD than those with no mental health problems sought medical treatment through VA primary care for medical problems. (Cohen et al., 2010)

Yet, PTSD is currently under-detected in primary care settings. One study showed that primary care providers successfully identified only 45% of patients who later were diagnosed with PTSD. In addition, many of the patients found to have PTSD diagnoses were not referred by their primary care providers to mental health. (Magruder et al., 2005)

For many veterans, primary care providers are often the first point of contact for seeking treatment for symptoms that may be related to PTSD. Thus, when veterans present to primary care for "physical problems," there is an opportunity for primary care providers to assess for and initiate management of PTSD symptoms, if present. When trying to assess or treat your patients, it is important to keep in mind that many of these vets may be experiencing extreme ambivalence or even fear about discussing or seeking treatment for their symptoms.

These are a couple possible reasons for the under-detection of PTSD in the Primary Care Setting. First, most patients who come to primary care present with physical complaints and do not volunteer or report symptoms of PTSD. Thus, PCPs must learn to recognize the links between physical problems and PTSD and inquire about possible PTSD symptoms. Second, PCPs may be reluctant to ask about traumatic events and symptoms due to time constraints and lack of training. Therefore, there is a need to increase PCPs' ability and confidence in recognizing PTSD symptoms, managing some PTSD symptoms, and referring to or consulting mental health colleagues about patients with more severe or refractory PTSD symptoms.

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Recognizing Signs and Symptoms of PTSD

Posttraumatic stress disorder (PTSD) was first classified as a psychiatric DSM diagnosis in 1980 (National Center for PTSD, 2016). As with most psychiatric diagnoses, specific criteria must be met in order to make the diagnosis of PTSD. The goal of most primary care providers is NOT to memorize the specific diagnostic criteria and definitively diagnose PTSD, but instead to recognize signs and symptoms of PTSD in our primary care patients. This will allow us to begin to manage some PTSD symptoms, particularly those with physical manifestations, such as sleep disturbances, substance abuse and chronic pain. It will also help us to talk to our patients about pursuing further assessment from a mental health specialist, who may be able to provide definitive treatment, if indicated.

The nature of PTSD requires that you adopt a nonjudgmental, empathic approach in the assessment of PTSD symptoms. Depending on the amount of time you are allotted for your assessment, a more in-depth evaluation involves questioning patients about the traumatic event and symptoms that have stemmed from the traumatic event.

PTSD Diagnostic Criteria

The following are the DSM-5 criteria for a formal diagnosis of PTSD (American Psychiatric Association, 2013). Please remember, you don't need to commit these criteria to memory but rather be able to recognize the signs and symptoms of PTSD.

Criterion A: Traumatic Event

The first criterion, known as Criterion A, requires that a person was exposed to death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence, in the following way(s):

- Direct exposure
- Witnessing the trauma
- Learning that a relative or close friend was exposed to a trauma
- Indirect exposure to aversive details of the trauma, usually in the course of professional duties (e.g., first responders, medics etc.)

Question to assess for Criterion A: "While you were in Iraq, did you encounter events in which you felt your life was in danger?"

Criterion B: “Intrusion” symptoms

Following that event, at least ONE of the following Criterion B symptoms must be present.

- Recurrent and intrusive distressing recollections of the event
- Recurrent distressing dreams or nightmares of the event
- Acting or feeling as if the traumatic event were recurring (including sense of reliving the event, illusions, and flashback episodes)
- Intense psychological distress at reminders of the event
- Physiologic reactivity to reminders of event

Questions to assess for Criterion B:

- “Since you returned, have you been bothered by memories or reminders of those events?”
- “What about dreams of the event?”

Criterion C: “Avoidance” symptoms

Following that event, at least ONE of the following Criterion C symptoms must be present.

- Avoidance of trauma-related thoughts or feelings
- Avoidance of trauma-related reminders

Questions to assess for Criterion C:

- “Many returning soldiers find that they want to avoid thinking or talking about these events. Would you describe yourself in that way?”
- “How about avoiding things, or people, or places that remind you of those experiences?”

Criterion D: “Negative alterations in cognition and mood” symptoms

Of the following, TWO must be present for a PTSD diagnosis:

- Inability to recall key features of the trauma
- Overly negative thoughts and assumptions about oneself or the world
- Exaggerated blame of self or others for causing the trauma
- Negative affect
- Decreased interest in activities
- Feeling disconnected or detached from loved ones
- Difficulty experiencing positive affect

Questions to assess for Criterion D:

- "Have you lost interest in things you used to enjoy?"
- "Have you felt detached or distant from the people in your life?"

Criterion E: "Alterations in arousal and activity" symptoms

Of the following, TWO must be present for a PTSD diagnosis:

- Irritability or aggression
- Risky or self-destructive behavior
- Hypervigilance
- Heightened startle reaction
- Difficulty concentrating
- Difficulty sleeping

Questions to assess for Criterion E:

- "Have you been having problems with your sleep since returning?"
- "Do you find yourself being alert and on guard in situations where there is no need to be?"
- "Have you been taking more risks or doing things that might cause you harm?"

Criterion F: The symptoms must last for more than one month

Criterion G: Symptoms create distress or functional impairment

Examples:

- Social impairment
- Occupational impairment

Screening and Assessment

Diagnosing PTSD can be challenging even for trained mental health clinicians. One of the main reasons that diagnosing PTSD can be challenging is that one of the hallmark symptoms of PTSD is avoidance. Avoidance may manifest as avoiding thoughts, feelings or conversations about the trauma. Another avoidance strategy, detaching from others, may make it challenging for the veteran to engage with you, the healthcare provider. In addition, there may be stigma associated with disclosing mental health symptoms

(National Center for PTSD, 2015). The diagnosis is often missed because patients do not volunteer information about traumatic histories or other symptoms they may be experiencing. By using unstructured interviewing techniques, a PCP can get answers to key questions; information that can help him/her decide if a patient might be suffering from PTSD.

Alternatively, you might choose to use standard questionnaires that assess for PTSD. An excellent screening technique, which is used widely in the VA and DOD is the brief, 5 question Primary Care PTSD Screen. This screen was originally developed by the National Center for PTSD for primary care settings and was found to be reliable and valid when compared with lengthier, gold standard, assessment measures (Prins et al., 2016). Benefits to the screen are its brevity and focus on symptoms rather than the trauma history itself. Because military personnel and veterans are often hesitant to talk about their war experiences, it is sometimes easier to focus directly on PTSD related symptoms.

Endorsement of 3 symptoms on the Primary Care PTSD Screen has been found to be highly sensitive for a presumptive PTSD diagnosis (Bliese, Wright, Adler, & Thomas, 2004). If the patient answers yes to 3 or more questions from the Primary Care PTSD screen, you can consider also using the PTSD checklist, or the PCL-5 (Blevins, Weathers, Davis, Witte, & Domino, 2015), for a more in-depth assessment. The PCL is also a validated, standardized screening instrument that is used widely in clinical practice. The PCL consists of 20 DSM-5 symptoms that constitute a diagnosis of PTSD. It can be particularly useful for primary care providers in identifying specific PTSD-related symptoms where you can intervene, for example, sleep disturbances or other symptoms like problems with concentration or attention that may require a referral to a specialist.

One important caveat on the scoring of the PCL: be aware that the PCL addresses Criterion B, C, D, and E symptom clusters of the PTSD diagnosis, but does not assess for Criterion A (traumatic event(s)). The instructions speak only to “a very stressful experience.” Thus, it is recommended that when you administer the PCL to the patient, you first establish whether or not a Criterion A traumatic event occurred. An example of a question you could use to establish the presence or absence of a Criterion A traumatic event is as follows: “While you were in Iraq, did you experience an event or events in which you felt your life was in danger or you witnessed others in danger?” Then, instruct the patient to answer the PCL questions in reference to the traumatic event or events they just identified. If the patient cannot identify a specific traumatic event, chances are, the symptoms they are experiencing are not PTSD, by definition.

Risk and Resiliency Factors

One thing to be aware of is that the majority of individuals exposed to a trauma will NOT develop PTSD. Sometimes, as physicians and mental health providers who are attuned to assessing for trauma, we may make an assumption that the person will be experiencing PTSD symptoms. Much more often than not, this is not the case. So in addition to assessing for symptoms or negative reactions following a trauma, assess for resiliency factors. These factors serve 2 purposes. First, they may help prevent a person from developing PTSD symptoms. Alternatively, when a person has PTSD, these factors are associated with recovery from their PTSD.

These resilience factors include:

- Social support
- Positive coping skills
- Self-efficacy

Factors that predict poor resiliency include:

- Mental health problems
- Prior traumas

When working with individuals who have experienced a trauma, it is important to provide psychoeducation around recovery from trauma and to communicate recovery expectations. The majority of individuals will either not develop PTSD, or will recover from their PTSD symptoms over time, either naturally or through treatment.

Presenting the Diagnosis

Following an assessment for PTSD, presenting your patient with the presumptive diagnosis of PTSD can be difficult because of the perceived stigma associated with the diagnosis. It is; therefore, important to normalize the symptoms of PTSD and inspire hope by explaining that effective treatments are available.

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Comorbid Conditions

There are several mental health problems and diagnoses that have similar or overlapping symptoms with PTSD. For example, clinicians may confuse symptoms of anxiety, mild traumatic brain injury with postconcussive symptoms, and depression with symptoms of PTSD. Symptoms of these disorders overlap with PTSD but may also represent distinct or differential diagnoses from PTSD. In addition, it is important to bear in mind that these diagnoses may co-occur (be comorbid) with PTSD (American Psychiatric Association, 2013). It is important to accurately distinguish PTSD from these other disorders so that patients receive therapies best targeted to their symptoms.

Readjustment Stress

While post-traumatic symptoms are not uncommon in returning veterans, keep in mind that there is a continuum of reactions and presentations upon returning home. A more common reaction for military personnel returning to civilian life is referred to as Readjustment Stress.

Readjustment stress is not a formal psychiatric diagnosis, but a common reaction following deployment. Often military personnel return from deployment and struggle to readjust to and reintegrate in civilian life (Strange & Brown, 1970). Some symptoms of PTSD are similar to readjustment stress. For instance, a large proportion of returning combat veterans, including those without PTSD, experiences sleep disturbances (Capaldi, Guerrero, & Killgore, 2011). Many returnees feel detached or disconnected or avoid talking to loved ones because they feel that their friends and family do not understand their military experiences. Some have difficulty finding enjoyment in activities they used to enjoy because those activities might feel trivial in comparison to the gravity of their wartime experiences (National Center for PTSD, 2014). If a patient is experiencing these types of problems, but they do not have other key symptoms of PTSD such as reexperiencing symptoms or even an identifiable “criterion A” traumatic event, it is probably readjustment stress.

Case Studies

The following are some case examples to help illustrate the similarities and differences between PTSD and these other diagnoses or co-occurring conditions.

Case Study 1:

Case: A patient who has very recently returned from combat presents with nightmares, heightened irritability, and disinterest in his usual activities. The patient's traumatic experience occurred only three weeks ago but he can't remember important details of the trauma. Additionally, the patient reports feeling dazed, and like things around him feel strange and unfamiliar – both during and since the trauma.

Differential criteria: Note that the traumatic event occurred only 3 weeks ago and the patient is experiencing posttraumatic symptoms AND dissociative symptoms.

Diagnosis: The patient is suffering from ASD. It is not uncommon for survivors of trauma to experience some posttrautmatic symptoms in the month following the event that subside within that month. For that reason, PTSD is not diagnosed until at least one month has passed since the trauma. The main take-home message here is that we should not diagnose anyone with PTSD in the first month following a trauma.

Additional Information: Acute stress disorder is the diagnosis given when significant posttraumatic stress symptoms are seen in the first month following trauma. In addition to the PTSD symptoms reviewed earlier, many patients with Acute Stress Disorder also experience dissociative symptoms at the time of or shortly after the event. Patients may feel "in a daze", emotionally numbed, or have temporary amnesia about the trauma. A PTSD diagnosis cannot be given until symptoms have lasted for a month.

About 80% of Patients who are diagnosed with ASD go on to develop PTSD (Harvey & Bryant, 1998). Not everyone with ASD will maintain these symptoms and develop PTSD and many people who have PTSD did not experience symptoms meeting diagnostic criteria of ASD (Cahill & Pontoski, 2005). While the two disorders often go hand in hand, they do not always.

<u>Case Study 2:</u>

Case: A patient who served in Iraq presents with sleep problems, loss of interest in activities, concentration problems, and feeling emotionally numb. Upon further questioning, you learn that he endured intense combat experiences where his life was in danger.

Differential Criteria: To make the correct diagnosis, you can question the veteran about reexperiencing symptoms (for example, nightmares, flashbacks, intrusive thoughts) and avoidance and hyperarousal symptoms which are more specific to PTSD (for example, avoiding reminders of the traumatic events, hypervigilance, and an exaggerated startle response).

Diagnosis: As these are all symptoms of PTSD, one might strongly suspect a PTSD diagnosis. But, these are ALSO symptoms of depression. In this case, in the absence of other PTSD symptoms, this constellation of symptoms is most suggestive of a depression diagnosis.

Additional Information: Depression and PTSD are highly comorbid – a landmark study of comorbidity by Kessler and colleagues found that nearly 50% of patients with PTSD also have major depressive disorder (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995).

The following symptoms of depression overlap with PTSD symptoms:

- Sleep problems
- Loss of interest in activities
- Persistent negative affect
- Concentration problems

Sometimes patients with depression are mistakenly classified as having PTSD because some symptoms overlap with PTSD and because physicians and mental health professionals are sometimes overly attuned to the potential of a PTSD diagnosis in veterans of war. Keep in mind, however, that a depressive reaction to trauma is as common as a PTSD reaction. Because depression is a common reaction to trauma, and because depression and PTSD are highly comorbid and associated with suicide (Hudenko, Homaifar, & Wortzel, 2018), it is essential that PCPs assess for suicidality when either one or both of these conditions are suspected. If your patient endorses suicidality, you and your patient should ideally agree upon a plan of action.

<u>Case Study 3:</u>

Case: A patient has recently returned home from deployment in Afghanistan. He presents to primary care complaining of anxiety and feeling "blue." He has had difficulty readjusting to civilian life and feels disconnected from his friends and family. He lacks interest in going out with friends and playing sports.

Differential Criteria: Further questioning could rule out a diagnosis of PTSD by asking about traumas in Afghanistan and if he is suffering from reexperiencing symptoms.

Diagnosis: In this case example, the patient is struggling with adjusting to a major life change: he is no longer serving in the military and he is readjusting to civilian life. The appropriate diagnosis would be Adjustment Disorder.

Additional Information: Both adjustment disorder and PTSD involve a psychological response to a stressor. PTSD develops after an extreme stressor, such as a threat to one's life. Adjustment Disorder on the other hand, may be a result of stressors of any severity that do not present a threat to life.

Unlike readjustment stress, adjustment disorder represents a psychiatric diagnosis. Typical examples of stressors leading to adjustment disorder are divorce, relationship problems, financial or job problems, moving, or becoming a parent for the first time. Symptoms of adjustment disorder can include anxiety symptoms (e.g. worry, nervousness, jitteriness) or depressive symptoms (e.g. sadness, hopelessness) that may also be seen in patients with PTSD.

Case Study 4:

Case: A veteran presents with what she describes as "panic attacks" and avoidance of crowds. Upon further questioning, you learn that the "panic attacks" involve increased heart rate, muscle tension, nausea, and sweating, and tend to occur when she is on a crowded bus. You ask her what she is thinking in these situations, and she says that the crowded bus reminds her of Baghdad where an unpredictable crowd could pose a significant threat. She then experiences memories of real life-threatening events in Baghdad and experiences extreme physiological reactions.

Differential Criteria: In this case example, initially, this patient's presentation sounded like panic disorder, involving panic attacks with the classic physiological symptoms of panic disorder and an avoidance of crowds. However, upon further questioning, you learn that the attacks only occur in situations that remind her of the trauma, followed by physiological symptoms.

Diagnosis: In this case example, a diagnosis of panic disorder would not be warranted; this is more suggestive of PTSD because the attacks are triggered by reminders of the original trauma.

Additional Information: Similar to Panic Disorder, patients with PTSD often experience intense physiological reactions such as palpitations, chest pain, hyperventilation, tremor, tunnel vision, and fear of dying in response to reminders of the traumatic event.

Panic disorder may be in the differential diagnosis of PTSD. The key distinguishing feature between Panic Disorder and PTSD is that panic symptoms occur "out of the blue" without provocation or trigger. PTSD symptoms, on the other hand, occur in reaction to a reminder of the original trauma. Patients often describe anxiety symptoms or physiological reactions related to PTSD as "panic attacks." The key follow-up question is: "Did the attack come on out of the blue, or did something trigger it?"

Panic Disorder is sometimes a comorbid diagnosis with PTSD, when the panic attacks occur without provocation, "out of the blue". The onset of panic disorder sometimes occurs following trauma, and can be diagnosed as a comorbid condition to PTSD, as long as the panic attacks occur without provocation or trigger.

Case Study 5:

Case: A patient who has very recently returned from combat presents with significant anxiety, accompanied by physical symptoms including: muscle tension, feeling "keyed up" and on edge, and increased heart rate. She also has difficulty sleeping and is feeling more irritable.

Differential Criteria: In this case example, if you determine that the patient does not have reexperiencing symptoms tied to the traumas she endured while in Iraq, the more likely diagnosis is Generalized Anxiety Disorder.

Diagnosis: In the absence of other PTSD symptoms, this set of symptoms is most suggestive of Generalized Anxiety Disorder.

Additional Information: Generalized Anxiety Disorder is characterized as chronic, exaggerated worry, even when there is little to provoke it. The worry extends to multiple facets of the patient's life such as: work, relationships, finances, and health. This chronic worry is accompanied by physical symptoms, such as: muscle tension, feelings of restlessness, and difficulty sleeping. Patients with PTSD, often experience a chronic sense of worry as well, but the worry is tied to re-experiencing the trauma and efforts to avoid reminders of the trauma. Further questioning could determine if the patient's worry is tied to multiple facets of her life.

The diagnosis of Generalized Anxiety Disorder cannot be given if its onset occurs at the same time as the onset of PTSD symptoms. Thus, if anxiety symptoms arise following the trauma that are similar to Generalized Anxiety Disorder, they are considered to be part of the PTSD. When the two syndromes are comorbid, the Generalized Anxiety Disorder likely preceded the trauma and even may serve as a risk factor for the development of PTSD.

Case Study 6:

Case: This patient suffered a blast injury created by an improvised explosive device. He describes the incident as traumatic, where his life was in danger and he experienced intense fear. He remembers very little of the event however because following the blast he suffered a loss of consciousness. He presents to primary care complaining of nightmares, concentration problems, irritability, hypervigilance, and insomnia. He has also been having severe headaches since the injury.

Differential Criteria: Further questioning is needed, in this case, to determine if the patient is experiencing other symptoms of PTSD, for example, re-experiencing or avoidance.

Diagnosis: His current presentation is more consistent with a history of mild TBI with lingering postconcussive symptoms.

Additional Information: Mild traumatic brain injury with postconcussive symptoms is defined as a head injury resulting in feeling dazed or confused, sustaining a loss of consciousness lasting less than 30 minutes and/or post-traumatic amnesia lasting less than 24 hours. In the months following the head injury, postconcussive symptoms are present in mild TBI. In the majority of patients who sustained a mild TBI, these resolve, but some have lingering problems including memory and attention, headaches, and balance problems.

Many of the Mild TBI with post concussive symptoms are overlapping with PTSD, especially:

- Concentration and memory problems
- Depression
- Irritability
- Insomnia

The key difference between mild TBI with postconcussive symptoms and PTSD are the physical symptoms and history. Therefore, in your patients with PTSD, it is important to assess for a history of head injury. Symptoms specific to mild TBI with postconcussive symptoms, that are not commonly seen in PTSD, include:

- Headaches
- Dizziness
- Loss of balance
- Sensitivity to light and noise

Mild TBI with post concussive symptoms in returning Afghanistan and Iraq military personnel is strongly associated with PTSD. Among military personnel soldiers who experienced a head injury with loss of consciousness, researchers found that 44% also met criteria for PTSD (Hoge et al., 2008).

Mild traumatic brain injury with postconcussive symptoms can be either a differential diagnosis or a comorbid disorder of PTSD.

Other Comorbid Conditions

Furthermore, there are a few more common comorbid diagnoses and related problems co-occurring with PTSD.

The first comorbid condition is alcohol and drug use disorders. Veterans who were exposed to combat situations and trauma are at risk for problem drinking upon returning home, and those with PTSD are at even higher risk for alcohol use disorders (Seal et al., 2011). The high degree of comorbidity between alcohol and drug use and PTSD is not surprising, as alcohol or drugs are often used to "self-medicate", in other words to avoid, numb, or alleviate negative thoughts, feelings, and symptoms associated with PTSD. Patients may view alcohol or drugs as a "quick fix" to alleviate discomfort associated with traumatic events, assuming that the memories will eventually subside. Unfortunately, though, the negative thoughts, feelings and symptoms may return even more strongly following attempts to numb them with drugs and alcohol. Recently, the association between PTSD and high-risk opioid use has been recognized (Seal et al., 2012). PTSD-related opioid misuse can have serious adverse outcomes, including fatal overdose, particularly when opioids are mixed with either alcohol or benzodiazepines.

Veterans with PTSD frequently suffer from increased irritability and anger, which puts them at a higher risk for engaging in violence and other high-risk behaviors. For instance, rates of interpersonal violence in veterans with PTSD are much higher than in the civilian population and higher than in veterans without PTSD (Norman, & Schnurr, 2018). Because there is no universal screening in the military or VA system to identify violence, primary care providers can be essential in recognizing and detecting violence. Brief interventions in primary care have been shown to be helpful in curbing some high-risk behaviors, such as alcohol and drug abuse and driving without seatbelts. But for other violent and high-risk behaviors, such as interpersonal violence, a referral to mental health services may be warranted.

Making Referrals to Mental Health

Primary care providers are critical in the detection, initial assessment, diagnosis, and, in many cases, initial management of PTSD and comorbid conditions.

Primary care providers should consider making a referral to mental health services in the following situations:

- For assistance in the diagnosis of complex patients who may have multiple comorbidities or differential diagnoses
- For deteriorating functional status, especially in patients with alcohol and substance use disorders
- For suicidality and homicidality
- For assistance with PTSD medication choices or for patients who are refractory to PTSD medications that you initiate in primary care. (Covered in the next module.)
- For evidence-based psychotherapy for core PTSD symptoms.

The following are tips for making referrals:

- It is helpful to mitigate the stigma and negative perceptions associated with mental health treatment
- You can normalize the idea of mental health treatment.
- You can explain that treatment usually starts with learning more about PTSD and learning and practicing daily coping strategies.
- You can explain that many behavioral treatments involve common sense, simple strategies such as deep breathing and relaxation techniques.

- You can suggest that making contact with other veterans with PTSD and seeing how others struggle and cope with the same challenges can bring comfort.
- When patients are particularly resistant to the idea of talking about their trauma and psychological symptoms, you can focus on symptom relief of more tangible symptoms, such as insomnia and concentration problems.

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Importance of Pharmacotherapy

Pharmacotherapy is an important option in the treatment of PTSD because a number of neurobiological mechanisms may be disrupted. For example, PTSD is linked to:

- Adrenergic hyperreactivity which can cause hyperarousal and re-experiencing symptoms
- Hypothalamic-pituitary axis (HPA) dysregulation which can cause stress reactions, including stress-related physiological changes such as high blood pressure
- Disruption of serotonergic system functioning, affecting re-experiencing, numbing, and hyperarousal symptoms, and comorbid disorders such as depression

In a meta-analysis of 25 randomized clinical trials examining pharmacotherapy for PTSD, there was a medication response in nearly 60% or participants, compared to 40% with placebo (Stein, Seedat, van der Linden, & Zungu-Dirway, 2000).

Selective Serotonin Re-uptake Inhibitors (SSRIs)

The strongest research evidence was for the use of selective serotonin re-uptake inhibitors (or SSRIs). SSRIs have demonstrated efficacy in reducing PTSD symptoms across several different symptom clusters and in producing global clinical improvement. As such, they are the most effective FDA-approved medications for PTSD to date (Jeffreys, 2018).

SSRIs are also effective treatments for the following conditions which can co-occur with PTSD:

- Depression
- Panic disorder
- Social phobia
- Obsessive-compulsive disorder

They are effective in reducing associated symptoms with PTSD, such as:

- Rage
- Aggression
- Impulsivity
- Suicidality

Although generally considered to be safe and well-tolerated, the following side effects are associated with SSRI's:

- Insomnia
- Restlessness
- Nausea
- Decreased appetite
- Daytime sedation
- Anxiety
- Sexual dysfunction

Sertraline and Paroxetine are the only FDA approved medications for the treatment of PTSD, though many other types of SSRIs are commonly used (Jeffreys, 2018). Research has shown that SSRIs are more effective when combined with psychotherapy.

The following are some tips for prescribing SSRIs:

- SSRIs are more effective when titrated up slowly to full dose
- SSRIs should be weaned off, not stopped abruptly
- Recommended dosing of SSRIs for PTSD can be found on the project resources page

Other Pharmacotherapy Options

If the side effects of SSRIs are not tolerable to your patients or you are targeting particular comorbid conditions such as chronic pain or smoking in addition to PTSD, consider the following options:

- Venlafaxine (a serotonin norepinephrine re-uptake inhibitor, SNRI): there is some evidence to suggest that venlafaxine is particularly useful with treatment-resistant PTSD and for co-morbid chronic pain, especially neuropathic pain
- Duloxetine: similar to venlafaxine, duloxetine is also FDA-approved for neuropathic pain, which can be useful in the treatment of PTSD-related chronic pain syndromes in returned combat veterans
- Buproprion: Wellbutrin is known for the absence of sexual side effects and its use in smoking cessation, but can be overly-activating for anxious patients and is contra-indicated in patients with seizure disorders

In the past, PTSD was sometimes managed with benzodiazepines. Subsequent research has shown that they have of NO EFFECT on core PTSD symptoms (Braun et al., 1990). Caution should be exercised when prescribing this type of drug. Benzodiazepines have been shown to be habit forming and when combined with other CNS-depressant medications, a risk factor for overdose. Many patients remain on benzodiazepines for PTSD which can be a risk for overdose if the patient is also receiving opioids for chronic pain. Benzodiazepines are often used to treat comorbid disorders like Generalized Anxiety Disorder or Panic Disorder. Other options exist for the treatment of generalized anxiety such as hydroxyzine, the SNRIs like venlafaxine, and the SSRIs like paroxetine.

Pharmacotherapy Management for Sleep Symptoms

Common symptoms that Primary Care Providers can manage are insomnia and nightmares. For insomnia, medication options include:

- Low dose trazodone (50-150 mg)
- Short-acting non-benzodiazepine (e.g. Zolpidem or "Ambien"): be aware that with zolpidem there may be parasomnias and daytime somnolence.
- Patients sometimes respond to melatonin

Research has shown that the alpha-blocker, prazosin, slowly titrated up (to max dose of 15 mg qHS) may reduce nightmares (Raskind et al., 2002). Advise your patients who are starting prazosin about the possibility of orthostasis and to take precautions to avoid falling when getting up from bed.

Medications for sleep disturbances related to PTSD are most effective when in combination with sleep hygiene and relaxation techniques as well as short-term cognitive behavioral therapy for sleep (Schoenfeld, Deviva, & Manber 2012). There are also some symptom management techniques that might be helpful to your patients experiencing insomnia or nightmares. This information and a patient handout are available in the resource library.

Pharmacotherapy Management for Mood Symptoms

We can also use pharmacotherapy to manage anger and impulsive aggression, often associated with PTSD. Research has shown that SSRIs reduce irritability and aggressive behavior. You may wish to seek consultation from a psychiatrist in prescribing the medications listed here. These are presented so that you have more familiarity because these medications may be prescribed for your patients with PTSD.

Mood stabilizers, anti-convulsants such as carbamazepine, valproic acid and gabapentin, can reduce emotional lability and aggressive behavior. When prescribing anti-convulsants, serum drug levels, CBC, and liver function tests will need to monitored throughout treatment. Also, patients will need to be warned about potentially fatal dermatological side effects such as Stevens-Johnson syndrome with some of the anti-epileptic medications.

Adrenergic blocking agents, such as prazosin and clonidine, may be used to reduce irritability, impulsive and aggressive behavior (Cherek, Lane, Pietras, & Steinberg, 2002).

Atypical antipsychotic medications, such as risperidone, quetiapine and aripiprazole, may also be used to reduce aggression and co-occurring psychotic behavior, albeit rare. These medications will need to be monitored for adverse side effects, the most pronounced of which is weight gain and metabolic syndrome.

When to Refer to Psychiatry

Regarding pharmacotherapy for PTSD, primary care providers should consider referral to psychiatry for the following:

- Assistance with medication choices
- Refractory symptoms after medication has been initiated in primary care
- Often the problem is that medications have not been titrated up sufficiently or medications have been stopped pre-maturely and have not been given an adequate trial

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Barriers to PTSD Treatment

Patients with PTSD are often reluctant to seek out and accept referrals for mental health treatment. They may feel hopeless or cynical about the effectiveness of mental health treatment and many believe that the problems will resolve on their own. They may feel shame about the traumatic event. Sometimes there is a stigma about accepting treatment because they fear they may be perceived as "weak" or that it may negatively impact their military career or current employment (National Center for PTSD, 2015).

They are also avoidant of reminders of the event, and don't wish to talk about it in therapy. Sometimes they are in denial that their symptoms and behaviors are problematic, and in contrast, sometimes feel that they are protective and hence may be reluctant to engage in therapies that focus on changing attitudes and behaviors. For instance, they believe avoidance and hypervigilance will protect them from reminders of the original trauma. Finally, they may live far from services or have other competing priorities such as school, job and family.

As primary care providers, you can encourage your patients to express and explore their reluctance to engage in therapy. In fact, this kind of exploration often represents the first stage of therapy.

Encouraging Patients

One evidence based technique for doing this is called Motivational Interviewing or MI. MI is based on the stages of change model which assumes that individuals are at different stages of readiness to change problematic behaviors. MI can help people progress to the next stage of change. In research studies, MI has been associated with positive behavioral changes including engagement in mental health treatment (Seal, 2012).

Patients at the precontemplation stage often don't believe that they have a problem and need education. Patients in the contemplation stage are beginning to consider the need for change. Patients are encouraged to consider which PTSD symptoms and behaviors are problematic for them. The patient identifies motivators that inspire him or her to change behaviors such as improving relationships, family life, or wanting to return to work or school. The patient also identifies roadblocks to change, for example, fear. Through reflective listening, open-ended questions, and expressing empathy, you can help elicit patient's own motivation to make positive change and possibly even consider seeking treatment.

Evidence Based Psychotherapies for PTSD

Below are three different evidence based therapies for the treatment of PTSD. There are others, but these are some endorsed by the VA.

Primary care providers do not need to become proficient in any of the following psychotherapies, instead, it's important for you know enough about each technique to be able to refer patients to therapy, to explain different options, and to answer basic questions about PTSD therapy. With knowledge of each technique, you can also sensitively provide support to your patients whose PTSD symptoms may temporarily become worse with therapy before they become better.

Prolonged Exposure Therapy

The way in which Prolonged Exposure Therapy works is that by talking about the trauma repeatedly, the patient de-sensitizes and is able to gain control of thoughts and feelings about the trauma (Foa et al., 2005). In this way, the trauma loses its emotional grip. The therapy attempts to correct abnormal fear responses and avoidance of neutral stimuli or experiences. Finally, prolonged exposure therapy facilitates a more healthy, emotional, and cognitive processing of the original trauma.

Prolonged Exposure is based on the following conceptual framework:

- Neural fear networks store memories of traumatic events
- Pathological fear networks create erroneous associations between the traumatic event and present-day life.

An example of a correct association is highways in Iraq and the threat of Improvised Explosive Devices (IEDs). In contrast, an example of an erroneous association is highways in the U.S. and the threat of improvised explosive devices or IEDs.

The fear networks of patients with PTSD contain more erroneous connections, are more easily activated and emotional and physiological consequences are more intense. The pathological fear networks disrupt normal processing of the trauma. PTSD symptoms then reflect an excessive and overgeneralized response to perceived threat.

These are the steps of Prolonged Exposure Therapy:

1. Psychoeducation- education about PTSD in terms patients can understand, which also aims to normalize symptoms
2. Teaching Progressive Muscle Relaxation and diaphragmatic breathing
3. Imaginal Exposure – retelling the story of the traumatic event in vivid detail, repeatedly, focusing on thoughts and feelings
4. In Vivo, or real-life exposure, which involves identifying real life situations that the patient avoids because these situations evoke reminders of the trauma. As homework, the patient is assigned exposures that have in the past challenged him or her, moving from less to more challenging exposures with time.

By repeated exposure to memories and reminders through imaginal and real-life exposure, the fear habituates.

Based on a number of randomized controlled trials, Prolonged Exposure Therapy has been found to be the most efficacious therapy for PTSD symptom improvement (Norman, Hamblen, Schnurr, & Eftekhari, 2018). However, it is a very challenging therapy for patients to endure. The PCP can be very instrumental in encouraging not only treatment initiation, but also retention in treatment by using techniques such as Motivational Interviewing. Prolonged Exposure can sound unsettling or scary to patients; however, as a PCP, being able to explain different psychotherapies like Prolonged Exposure Therapy clearly and to answer questions can help a patient become more open to a treatment options that might work for them.

Cognitive Processing Therapy

The goal of Cognitive Processing Therapy, or CPT, is to help the patient gain a sense of mastery and control over the traumatic event (Resick, Nishith, Weaver, Astin, & Feuer, 2002). Patients with PTSD often create distorted cognitions to make sense of their trauma. For example, a patient might think, “My friend’s death was my fault. I should have been there to protect him.” The goal of CPT is to challenge those cognitions. In this case, “My friend’s death was not my responsibility.”

These are the steps of CPT:

1. Psychoeducation- education about PTSD in terms patients can understand, which also aims to normalize symptoms
2. Identify problem areas in thinking about the event.

3. Recognize the relationships between thoughts and feelings and to have the patient write a detailed account of the trauma and read daily.

The role of the therapist is to challenge assumptions and cognitive distortions and to help patients become aware of areas where they may be stuck. Finally, CPT focuses on themes of safety, trust, power, esteem, and intimacy.

Eye Movement Desensitization and Reprocessing

Eye movement desensitization and reprocessing, or EMDR, combines elements of Prolonged Exposure with bilateral stimulation (Shapiro, 1989). An example of bilateral stimulation would be moving the eyes back and forth. In EMDR, the patient recounts the traumatic event while focusing on moving his or her eyes left and right. The theory is that EMDR transforms the traumatic memory by making new associations with neutral stimuli such as eye movements.

Group Therapy

Although not as extensively studied as individual treatments, research has shown that group therapies for PTSD that borrow from PE and CPT are also efficacious in alleviating symptoms (Norman, Hamblen, Schnurr, & Eftekhari, 2018). The primary benefit of group therapy is that it allows patients social support and to recognize that others, like themselves, are having similar difficulties.

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Learning Objectives:

- Standardized patients will learn to convincingly and confidently play the role of their assigned veteran character in a simulated clinical encounter.
- Standardized patients will become familiar with the logistics of the trial's recording and interview process, and be able to carry out that process independently once assigned a scheduled interview.

Pre-Work

Assign Read-Aheads / Pre-Work	**Time**	**Facilitator**
1. Article about Standardized Patients (role/process) 2. PTS Brochure 3. Sample PTSD Patient videos 4. Listen: Provider/Patient Interview: 'Nancy & Dr. C.' 5. Your Character(s): An overview of the Veteran role(s) that you will play as an SP	1 to 2 hours	Coleen & Tanisha

One-Day Training

AGENDA	**Time**	**Facilitator**
Introductions & Training Overview	30 min (8:30-9:00am)	Natalie & Coleen
What are Standardized Patients (SPs)? • *Overview of SPs' role, and use in medicine/mental health education/assessment.* • *Understanding the basic principles and best practices of SP acting.*	20 min (9:00-9:20 am)	Natalie & Tanisha
SPs in the Virtual Worlds Trial • *Brief overview of Virtual Worlds trial design and aims, focused on SP portion.* • *Understanding what SPs will do in the trial, including logistics and timing of SP interviews, importance of blinding, plans for quality assurance review/feedback* • *Demo of any complex logistics (e.g., calling into Skype conference call; recording interviews; uploading recordings, etc.)*	60 min (9:20-10:20am)	Coleen & Natalie
Break	10 min (10:20-10:30am)	
Posttraumatic Stress: An Introduction • *Understanding the signs and symptoms of military-related post-traumatic stress.* • *What can posttraumatic stress look and sound like? View video examples.* • *Q&A*	60 min (10:30am-11:30am)	Tanisha & Linda

AGENDA	**Time**	**Facilitator**
Meet Your Character • *Review of character sheets.* • *Group Activity; Tell who 'you' are in your own words (1st person)* • *Character Q&A: Ask questions about your characters; talk about the gray areas.*	60 min (11:30-12:30pm)	Linda & Natalie
Lunch Break	30 min (12:30-1:00pm)	
Practice Role-Play: Provider Interview 1 (Triad Activity) • *Break into groups of three. Each takes one role (Provider; SP; Observer).* • *Provider (with script) interviews SP (no script); Observer gives feedback to SP.* • *Triads roles rotate until all three participants play all three roles.* • *Each role-play is 10 minutes. Each SP feedback session is 5 minutes.*	60 min (1:00pm-2:00pm)	Natalie & Linda
Debrief & Feedback on Role-Play Session	20 min (2:00-2:20pm)	Natalie & Linda
Break	10 min (2:20-2:30pm)	
SP Role-Play (Simulating Trial Conditions – each in private room, if possible) • *Each SP is paired with a real provider from the training team for the role-play (Instructions-15 min).* • *Provider/SP do unscripted role-play (30 minutes).* • *Provider shares feedback on SP performance privately (15 minutes)*	60 min (2:30-3:30pm)	*Providers (1 per SP):* **07/25/2018:** 1. Jerika (psych) 2. Samantha (psych) 3. Kara 4. Linda 5. Karen 6. Jen **07/26/2018:** 1. Alexandra (psych) 2. Kara 3. Linda 4. Karen 5. Beth 6. Jen
SP Role-Play Debrief (Full Group)	15 min (3:30-3:45pm)	Natalie, Linda
Wrap-Up, Overview of Lessons Learned, Final Q&A	45 min (3:45-4:30pm)	Natalie & Coleen

Carlos

Carlos is a 47-year-old Air Force veteran who served 22 years as a medic in Desert Shield/Desert Storm (the Gulf War) in and Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF). He is married and currently retired. He felt "fine" until 7 years ago when he saw a bad accident on the road and then began feeling more irritable, cautious, and suspicious of others. He has trouble sleeping at night. He doesn't like crowds but misses socializing with friends and family members (e.g., going to concerts, festivals). His wife gets upset with him; she doesn't understand why he's not enjoying his retirement. He is slightly overweight, doesn't exercise, and was just diagnosed as diabetic. He spends his days watching TV and doing a few errands with his wife when he feels up to it. He is angry and frustrated with his nightmares about accidents/injuries that he treated in combat. He's started drinking every night because he just wants something to help him sleep (a recent habit that his wife does not appreciate). He presents in a guarded manner and thinks mental health is for the "weak" but also realizes his symptoms are getting worse and is worried how all of this is impacting his enjoyment of life. He would like the doctor to prescribe sleeping medication, and he realizes his drinking isn't really helping his sleep.

Trauma: witnessing and treating multiple injuries as a medic

Carlos (con't)

What the Veteran says:	PTSD symptoms (and category)	Presenting concerns
Revealed at first presentation:		
Feels irritable and uptight –wants meds to relax	Hypervigilance/Reactivity [Criterion E]	Anxiety
Has nightmares regularly	Re-Experiencing [Criterion B]	
Want to fall and stay asleep easily; having trouble doing so.	Hypervigilance/Reactivity [Criterion E]	Insomnia
Revealed with some initial MI inquiry:		
Doesn't like to go out; thinks people aren't trustworthy: no one understands what he's been through	Negative Thoughts [Criterion D]	
Drinks alcohol to help him sleep and avoid memories of combat: says everyone drinks to "chill"	Avoidance [Criterion C]	Alcohol abuse
Was always strong in the military and able to cope with all kinds of trauma – he likes thinking about those times but lately everything seems to remind him of only the bad times	Avoidance [Criterion C]	MH concerns?
Revealed with strong or ongoing MI inquiry:		
Doesn't like how much he's withdrawn-misses going out with his wife and friends	Negative Thoughts [Criterion D]	
Wants a good relationship with his wife		
Is worried about his health conditions: his dad died from a heart attack at the age of 51		Family hx of heart disease

From the Medical Record:

Active Medical Issues	Medications
Anxiety	Diazepam 5 mg
HTN	HCTZ 25/Lisinopril 20 mg
Erectile dysfunction	Sildenafil 10 mg
Diabetes	Metformin 500 mg

Imelda

Imelda is a 33-year-old female Army veteran. She joined the Army at age 18 to get away from a chaotic childhood. She injured her neck during training and also experienced military sexual trauma. She did not deploy to a combat zone. She has been unable to work due to pain, and moved in with her grandparents who provide her with room and board in exchange for her helping with errands. She has moved away from her friends, and has difficulty socializing due to pain and "trust" issues. Recently, she's gained 30 pounds and feels she can't exercise due to her neck pain. She spends her time on social media and is worried that she will never meet anyone. She feels isolated and sad, and she doesn't think anything will help her feel better. She presents as helpless and passive, and she responds to many questions with, "I don't know." She lives in an isolated rural area where there is limited medical care. She needs to uses Uber to come to the main VA facility for most of her care. She is confused as to why the VA has been decreasing her opioid medication for neck pain. She wants the doctor to refer to someone who will "fix" all her pain. She really wants to live a normal life and is hopeful that she can be more mobile and even start working again someday.

Trauma: sustained a severe neck injury during military exercises; experienced military sexual assault after her injury

Imelda (con't)

What the Veteran says:	PTSD symptoms (and category)	Presenting concerns
Revealed at first presentation:		
Doesn't know what to do; just feels yucky and feels like a failure	Negative Thoughts [Criterion D]	Apathetic
Pain is unbearable		Chronic pain
She has "no life"		
Revealed with some initial MI inquiry:		
Can't sleep and nightmares about military	Re-Experiencing [Criterion B] & Hypervigilance/Reactivity [Criterion E]	Insomnia
Feels very alone –wants someone to help her	Negative Thoughts [Criterion D]	
Is scared that she is permanently "scarred"		
Revealed with strong or ongoing MI inquiry:		
Doesn't trust anyone; she misses her friends greatly. She thought the military would help her self esteem		
Feels like she's stuck at 18 emotionally, and the pain is overwhelming; nothing has helped so far	Negative Thoughts [Criterion D]	
Deep anger about military accident and sexual abuse; wants to stop the "bad" thoughts but they come every time she sees a man	Re-Experiencing [Criterion B]; Hypervigilance/Reactivity [Criterion E]	

From the Medical Record:

Active Medical Issues	Medications
Chronic Pain	Lidocaine patch
Chronic Pain	Hydromorphone 4mg
Obesity	N/A
Allergies	Cetirizine HCL 10 mg
Insomnia/nightmares	Prazosin HCL 2 mg

Mike

Mike is a 39-year-old male Marine Corps veteran. He recently got married and is currently using the GI bill to attend school for communication. He wants to work in journalism but struggles with anger and has issues with authority. He was employed in construction before the military, but his injuries prevented him from continuing with that career. He works out daily but uses marijuana ("MJ") to relax every night. His wife "nags" him constantly for smoking. He says she doesn't understand what he saw (he doesn't want to talk to her), and MJ is the only way he can keep the nightmares away. He presents as eager to get better, but doesn't want to use too many VA services since there are "others much more worse off" than he is. He views school as his "escape" but also mentions that he's been having trouble concentrating on his schoolwork. He wants the VA doctor to put in a referral for disability and write a note to his wife that "MJ" is helping his medical condition.

Trauma: experienced multiple IED explosions, including one where he saw his best buddy die

Mike (con't)

What the Veteran says:	PTSD symptoms (and category)	Presenting concerns
Revealed at first presentation:		
Can't focus at school	Hypervigilance/Reactivity [Criterion E]	Difficulty Concentrating
Feels like he's always irritable and only MJ helps	Hypervigilance/Reactivity [Criterion E]	Drug abuse?
Doesn't want to look weak compared to what some other guys have to deal with		
Revealed with some initial MI inquiry:		
Worried he can't make it in school and that he's going end up with some "stupid" job		Anxiety
Feels these "civilians" are very undisciplined compared to those who go into the military	Negative Thoughts [Criterion D]	
Has trouble sleeping as he wakes up sweating and remembering his combat tour; he's tired of being tired	Re-Experiencing [Criterion B], and Hypervigilance/Reactivity [Criterion E]	Insomnia
Revealed with strong or ongoing MI inquiry:		
Deeply misses the military and wishes he could go back –knows he can't but wants to find that camaraderie	Negative Thoughts [Criterion D]	
Scared that if he doesn't "snap out of it," his wife will leave him and she's his only support		
He uses FB daily to see what his former friends are doing; doesn't want to talk or think about the horrific things he's seen but every social media post reminds him of his military experience	Avoidance [Criterion C]; Re-Experiencing [Criterion B]	

From the Medical Record:

Active Medical Issues	Medications
Pain and insomnia	Amitriptyline 25 mg
Pain	Baclofen 10 mg

Martin

Martin is a 74-year-old Vietnam Army veteran, and a right-leg amputee from the knee down. He is divorced and has two adult sons whom he rarely sees. He hasn't worked since he lost his leg in Vietnam. He struggles with obesity, hypertension and pain. He's been prescribed opioids for pain and is angry that his physicians are trying to reduce his dosage. He lives in a rural area but has access to the VA shuttle. Coming to the VA is his only form of socialization; he says that he doesn't "like people," although he'd really like to reconnect with his kids. Lately, a decrease in pain meds is making it harder for him to come to the VA, and he is becoming more isolated and unhappy. When at the VA, he seems to talk non-stop, sharing about his experiences in Vietnam. He struggles financially and thinks that the VA should provide more financial assistance and housing support. When discussing these struggles, he can feel dejected and hopeless, sometimes wondering is life is worth living.

Trauma: Vietnam combat; one specific fight where he shot villagers, including children

Martin (con't)

What the Veteran says:	PTSD symptoms (and category)	Presenting concerns
Revealed at first presentation:		
Needs money		Financial instability
Needs his pain meds		Chronic pain
Sick of repeating his story to a new "guy" every time at the VA; feels everyone is a "fake" and the world is an "evil" place	Negative Thoughts [Criterion D]	
Revealed with some initial MI inquiry:		
Only feels safe at the VA with other veterans; thinks the "enemy" is always out there	Hypervigilance/Reactivity [Criterion E]	
Doesn't sleep more than 2 hours due to pain and "thoughts"	Re-Experiencing [Criterion B] E	Insomnia
Wonders if life is worth it after the horrid things he's done, plus he has no friends and is a "cripple"	Negative Thoughts [Criterion D]	Suicidal?
Revealed with strong or ongoing MI inquiry:		
Everyday, something on the TV reminds him of combat and Vietnam	Avoidance [Criterion C]	
Has a lot of guilt about how he acted with his family; he's always been an "angry" guy; he misses his kids	Negative Thoughts [Criterion D] E	
One of his good friends died of a drug overdose, and he doesn't want to end up like that		

From the Medical Record:

Active Medical Issues	Medications
Acid Reflux	Omeprazole 20 mg
Insomnia	Trazadone
HTN	HCTZ 25mg/Lisinopril 20 mg
Congestive Health Failure	Metropropol 25 mg
Chronic Pain	Oxycodone HCL5mg / Acetaminophen 325 mg

Nancy

Nancy is a 52-year-old female Navy veteran, who served stateside during Gulf War/Desert Storm. She is married, has two daughters, and presents to VA complaining of stress due to parenting. She works in a bank, where she has a stable position. She's been married 27 years but complains about her husband's apathetic attitude. She is physically healthy, but has borderline high cholesterol and would like to lose 15 pounds. She has a history of headaches, but lately they've been getting worse and she wonders if she needs stronger medications. Her main concern is her 21-year-old daughter. She dropped out of college, moved back home and isn't very motivated. She compares her daughter to herself at 21, when she was extremely motivated, in the Navy, finishing college, and planning her career. She struggles with feelings of rage and anger towards her daughter. She states she wants the best for her and can't understand why she is so lazy. Nancy has been having trouble sleeping and wakes up several times at night feeling restless and perseverating about her daughter. She wonders if "something is wrong" with her daughter or "something happened to her that she won't tell anyone." Nancy casually states she has some dark experiences from the past but has moved beyond it. She has a few friends but prefers not to leave the house; "work and parenting" take up all her time. She is neatly groomed, but appears slightly anxious. Although friendly, she puts off a guarded, "stay away" attitude.

Trauma: military sexual harassment by her superiors

Nancy (con't)

What the Veteran says:	PTSD symptoms (and category)	Presenting concerns
Revealed at first presentation:		
Angry with her daughter, irritable a LOT	Hypervigilance/Reactivity [Criterion E]	Parenting issues
Worsening headaches		Migraines?
Has trouble sleeping	Hypervigilance/Reactivity [Criterion E]	Insomnia
Revealed with some initial MI inquiry:		
Worried that "something" happened to her daughter; lack of sleep and anxiety has been interfering with her job		Anxiety
She's been having a lot of unpleasant memories of being "harassed" as the only woman in her unit	Re-Experiencing [Criterion B]	MST?
She hasn't seen her friends or done any of the fun things she used to do for herself	Negative Thoughts [Criterion D]	
Revealed with strong or ongoing MI inquiry:		
She was able to overcome adversity, stress, and pain and wants her daughter to be able to do the same; she's concerned at how much this is bring up old "unpleasant" memories	Avoidance [Criterion C]	
Feels like she's been "super alert" and "super protective" with her daughters	Hypervigilance/Reactivity [Criterion E]	

From the Medical Record:

Active Medical Issues	Medications
Headaches	Paprozen 500mg

Kelsey

Kelsey is a 41-year-old, military intelligence officer and who has been in the Army for 22 years. She's a highly competent soldier and has always been tough as nails. Over the years, she rose to a senior position in military intelligence—one of the first women promoted to this important leadership role in her Army intelligence division. The younger intelligence officers, especially women, really look up to her and expect her to be a strong leader. And she always has been. She's had to make difficult calls throughout her career, and her decisions sometimes impact who lives and who dies halfway across the globe. It's all part of the job, and necessary in the fight against terrorism. When things have not gone as planned, she's coped by blocking it all out. Mission accomplished—put it behind you, have a few glasses of wine. And that's worked well for her… until the last few months. She oversaw a recent mission that was shaped, in part, by faulty intelligence. No U.S. soldiers were killed or harmed, but twelve innocent civilians were. It was an error made in good faith; collateral damage happens in war. But she can't stop thinking about what happened. She didn't see it with her own eyes, but her imagination keeps running wild. Images of children crying beside their dead parents flash into her mind randomly, and she wakes up with nightmares at night. She's short-tempered and on edge, shouting at her husband and losing her cool with other people. She can't think straight. She just wants to lock herself away and draw the curtains. She's been on sick leave for 3 weeks and can't see herself going back to work. She doesn't know what to do. Most of her life, she's assumed that people with mental problems were just weak and needed to toughen up. Now she's the "weak" one.

Trauma: moral distress at her responsibility for the lives and deaths of soldiers and civilians

Kelsey (con't)

What the Veteran says:	PTSD symptoms (and category)	Presenting concerns
Revealed at first presentation:		
"I can't pull myself together" – need doctor to "help me get back to work and be the person I was."	Negative Thoughts [Criterion D]	Unable to work
"I'm not sleeping" – wants something that will "knock me out" at night, so even nightmares won't wake me up.	Hypervigilance/Reactivity [Criterion E]	Insomnia; nightmares
Distracted and can't concentrate—emphasizes that she's not usually like this.	Hypervigilance/Reactivity [Criterion E]	Difficulty concentrating
Revealed with some initial MI inquiry:		
She feels embarrassed and ashamed—what if the junior officers who look up to her so much saw her in this state?	Negative Thoughts [Criterion D]	Shame and sadness
She is fearful that the life she knew is over and that she'll never get better: "I am no longer the person I was."	Negative Thoughts [Criterion D]	Hopelessness
She doesn't want her distress to impact her relationship with her husband, who is also career military. She's already snapping at him for no reason; there's some strain there.		Relationship difficulties
Revealed with strong or ongoing MI inquiry:		
She is bothered deeply by the thought that her choices have resulted in other people's deaths, and she can't stop thinking about the ripples of harm caused by this violence.	Re-Experiencing [Criterion B]	
She has never really grappled with the moral or ethical implications of the actions she's taken on behalf of her country; she's always been proud to serve and to defend America, but she's feeling increasingly lost and disillusioned—Is what she's doing right?		
A part of her knows she's really a good person; she cares deeply for the young soldiers on her team; she wants to support them and be there for them.		

From the Medical Record:

Active Medical Issues	Medications
none recorded	on oral contraceptives / no other medications

Virtual Worlds: Product Review

Training Session Flow

Session 1

- Outside Medical Center
- Lobby
- Alex's Doctors Appointment
- Alex's Apartment
- Classroom
- Warzone
- Amphitheater
- Practicum room

Session 2

- Outside Medical Center
- Lobby
- Barriers to care
- Modalities of care
- Amphitheater
- Practicum room

Extras

- Orientation Island

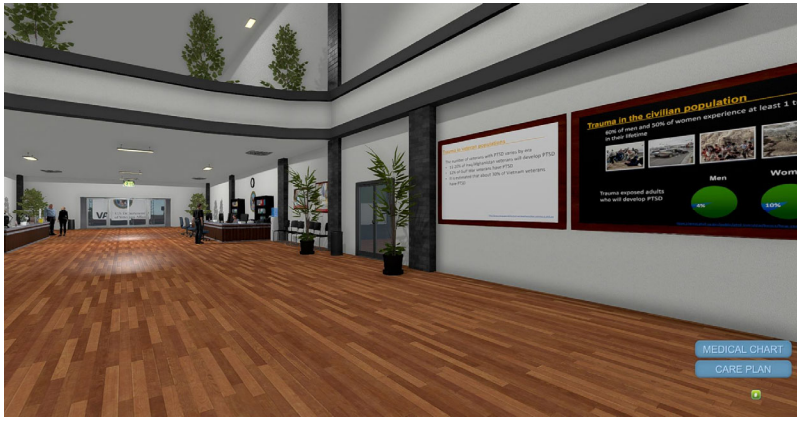
Medical Center & Session 1 Activities

Outside of the Medical Center

- High-resolution shots from CNDG
- 2 shots from afar and 2 close-ups of entry way with avatar

Lobby

- 7 images
- All good quality
- Different orientations



Alex's Doctors Appointment

- Many high quality images
  - 12 with audience and different camera angles
  - 3 with no audience


Interviews
Floor Paths
Admin TPs
Activity TPs
Group TPs
Play Interview 1
Group Selection
Play Interview 2
User Planning
Close
Hide Menu
MEDICAL CHART
CARE PLAN
Stand Up
Chat
Friends
Inventory
Outfit
Snapshot


Interviews
Floor Paths
Admin TPs
Activity TPs
Group TPs
Play Interview 1
Group Selection
Play Interview 2
User Planning
Close
Hide Menu
MEDICAL CHART
CARE PLAN
Stand Up
Chat
Friends
Inventory
Outfit
Snapshot

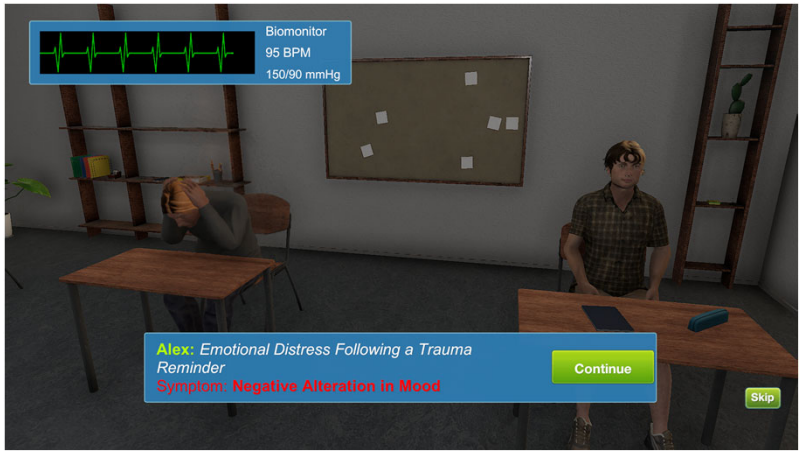
Alex's Apartment

- A few snapshots of the bedroom, living room, kitchen
- CNDG took high quality shots of Alex and his wife


Voice Chat
YouHaveJoinedAVivoxVoiceChannel
Alex's Apartment
MOVE forward and click on Gina (your/Alex's wife).
LISTEN to the conversation.
CONTINUE
Chat
Friends
Inventory
Outfit
Snapshot

Classroom

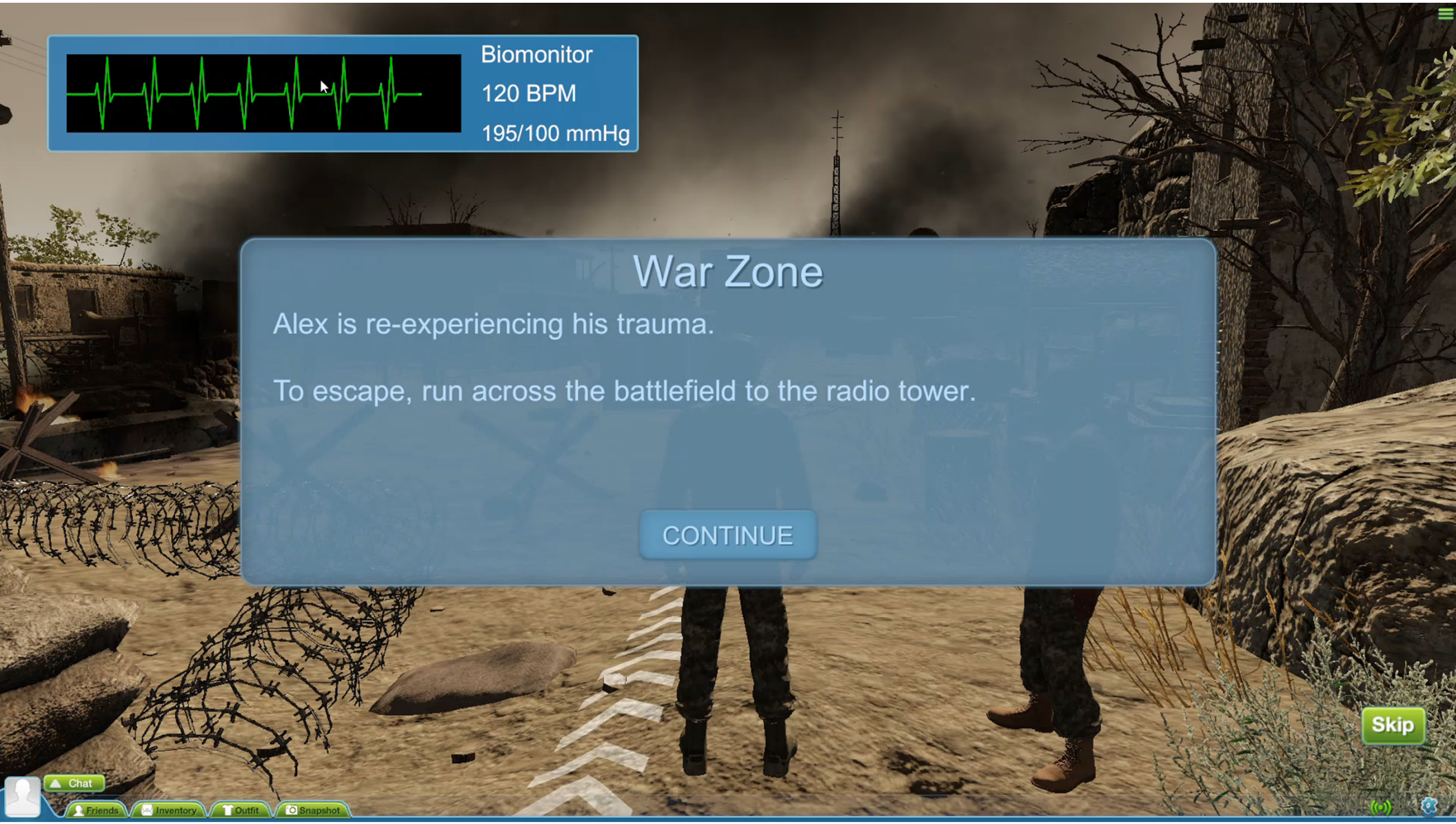
- 9 images of the classroom
  - Taken at different timepoints
  - High-quality




Biomonitor
70 BPM
115/75 mmHg
Welcome to class
Click an empty desk to take a seat.
The biomonitor in the upper left corner of your screen measures Alex's changing heart rate and blood pressure.
CONTINUE
Skip

Warzone

- 11 images
  - 7 beauty shots from CNDG
  - 2 of the surroundings alone
- All very good quality


Biomonitor
120 BPM
195/100 mmHg
War Zone
Alex is re-experiencing his trauma.
To escape, run across the battlefield to the radio tower.
CONTINUE
Skip
Chat
Friends
Inventory
Outfit
Snapshot

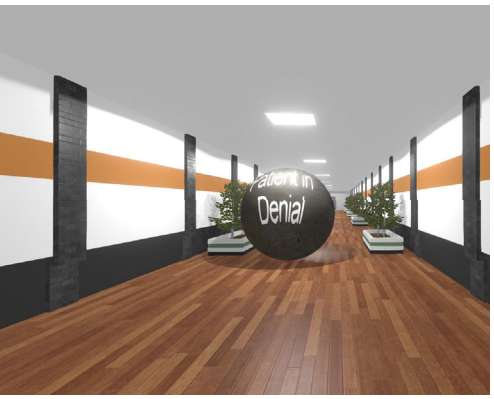
Amphitheater

- 10 high quality images from CNDG
  - 5 different orientations with no audience
  - 4 orientations with an audience
  - 1 with avatar and no audience

Practicum Room

- 2 images of the practicum room with no audience

Session 2: Additional Activities



Barriers to Care

- There are 5 activities within barriers to care – all are imaged


Barriers to Care
BARRIERS to care come in all shapes and sizes.
THESE metaphorical barriers are from the perspective of the physician.
TO begin the activity, walk toward the door at the end of the hallway.
CONTINUE
Chat
Friends
Inventory
Outfit
Snapshot

Modalities to Care

- 17 High Quality images
  - 7 images of the room in different orientations including close-ups
  - 10 images containing participants

Extras:
Orientation Island

- 2 high quality images from CNDG

Other Products

- Modalities of Care Video
- Presentation Shorts
- MI videos
- Practicum Room Pictures: with audience
- Lobby Pictures: with audience
- Posters

- Orientation Island Video

Virtual Worlds Technology to Enhance Training of Primary Care Providers in PTSD and Motivational Interviewing for Veterans

Karen H. Seal, MD, MPH
San Francisco VA Health Care System
University of California, San Francisco

ISTSS Virtual Annual Meeting (November 4-14)

Co-Investigators/Key Personnel: Thomas Neylan, MD; Shira Maguen, PhD; Beth Cohen, MD, MS; Greg Reger, PhD; Natalie Purcell, PhD; Jennifer Manuel, PhD, Dan Bertenthal, MPH

Funding: **Department of Defense; Award** W81XWH-15-C-0088

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I, Karen Seal, have no commercial relationships to disclose.

Study Background

Clinical Problem: Most veterans with PTSD first present to primary care (vs. mental health) because of physical symptoms associated with PTSD (e.g., disrupted sleep, substance use issues)

- Primary care providers (PCPs) often fail to identify or manage PTSD-related symptoms because they lack training

- Few PTSD trainings target PCPs; none provide communication training in how to mitigate stigma re: PTSD and motivate mental health engagement.

Study Background

Existing solution: **Asynchronous, web-based PTSD training for PCPs with pre-recorded clinical vignettes**

- Few IT glitches or scheduling constraints, low budget
- PTSD knowledge and perceived self-efficacy improved in 70 PCPs who completed the online asynchronous training (Samuelson K, 2013).
- Lacks interactivity; no practice opportunities; gains not durable; effect on clinical behavior unknown.

New solution to be tested: **Synchronous Virtual World training**

- Interactive, simulates trauma and PTSD symptoms; PCPs practice communication to improve PTSD assessment & symptom management.
- The feasibility, acceptability, usability and preliminary efficacy unknown

AIMS

Overall Aim:
To build competency among a primary care workforce to better detect and manage PTSD symptoms and motivate treatment engagement in veterans, which may generalize to other populations.

Specific Aim:
Conduct a RCT of a Virtual Worlds vs. Web-Based PTSD training

Design and Methodology

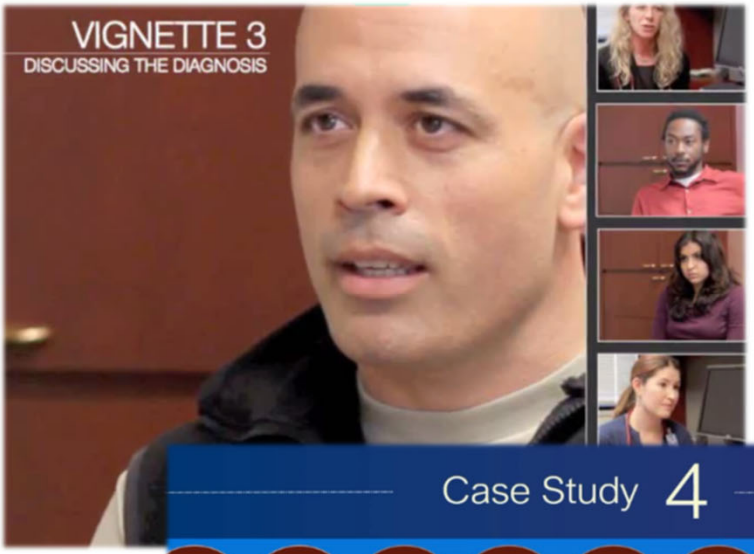
Randomized Controlled Trial (N=100 PCPs):

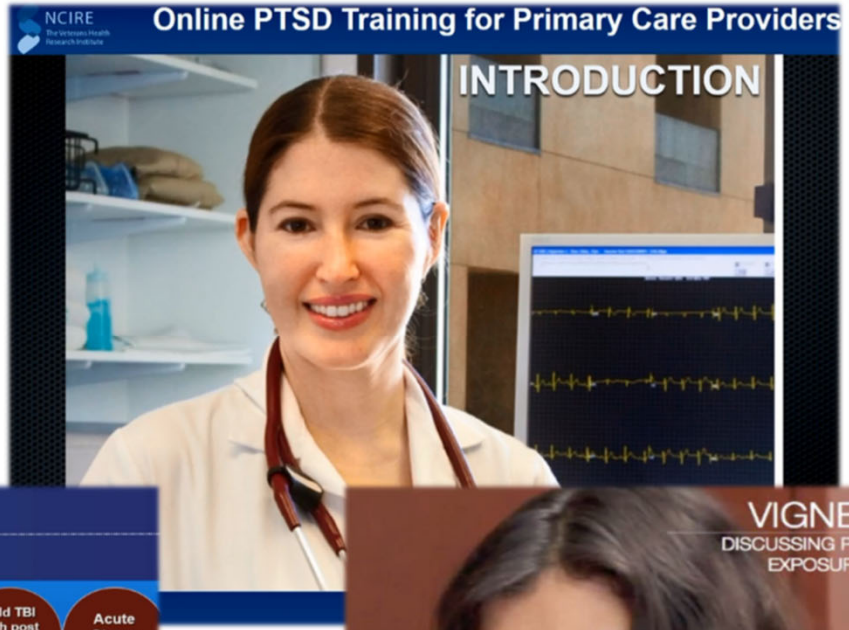
- **Intervention:** synchronous training in a VW environment
  vs.
- **Control:** asynchronous web-based training

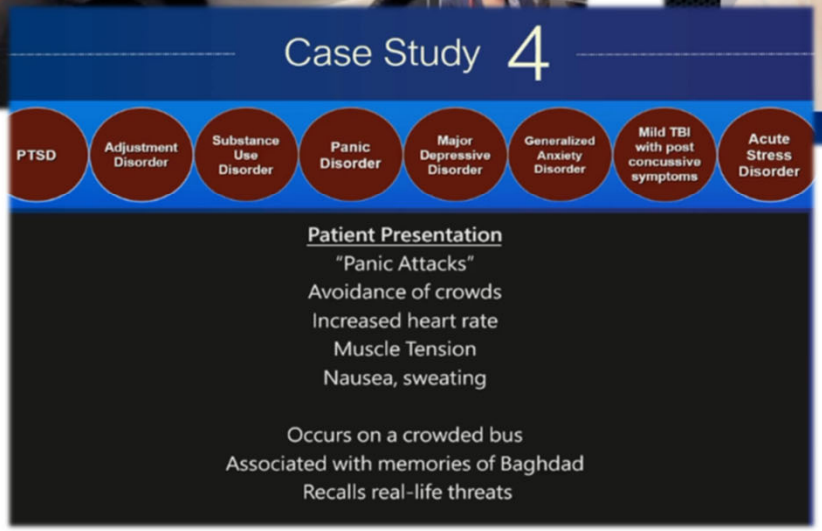
Outcomes (baseline, post-training, 90-day follow-up):

- **Standardized Patient** assessments (MI and PTSD-related skills in assessment and management)
- **Self-Report Survey** (PTSD knowledge, clinical self-efficacy, satisfaction with the training, System Usability Scale)

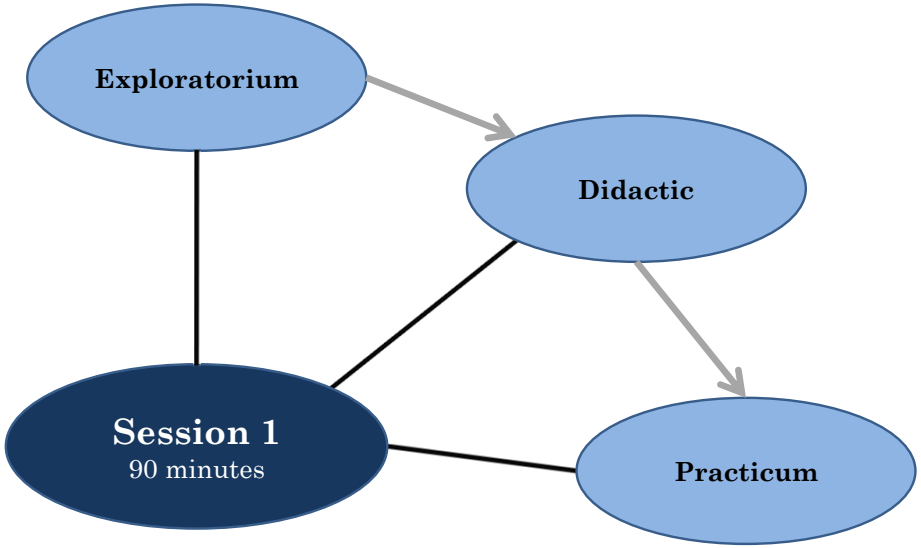
Asynchronous Web-Based Training

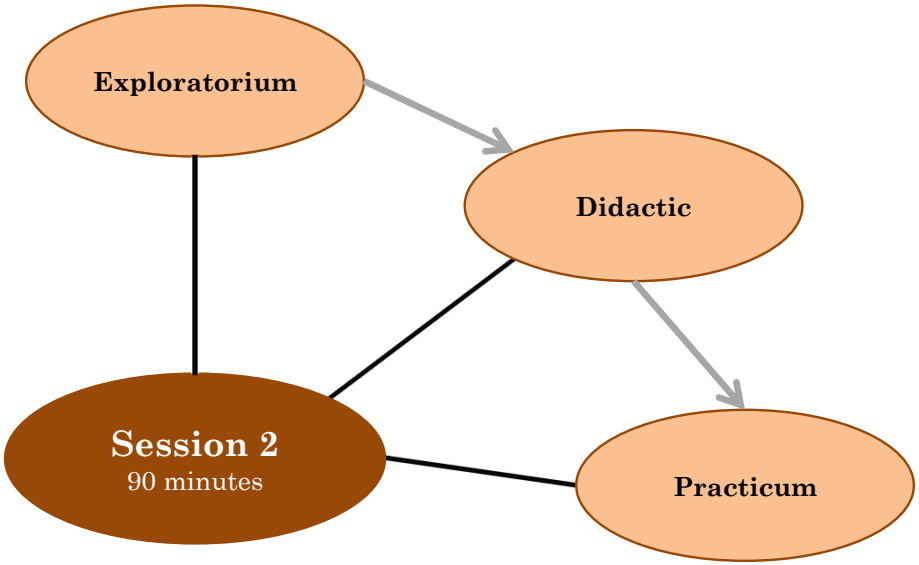






Virtual World Training Design



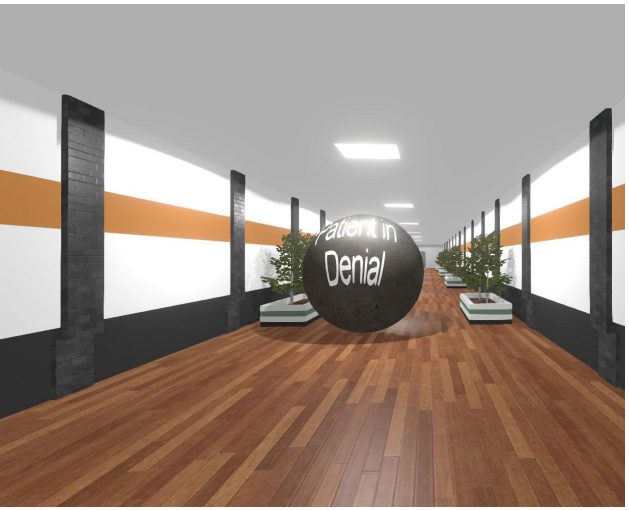


Virtual World: Like you are there

Exploratorium

Experience a War Zone as a Veteran

Overcome Barriers



Learn about Modalities of Care for PTSD

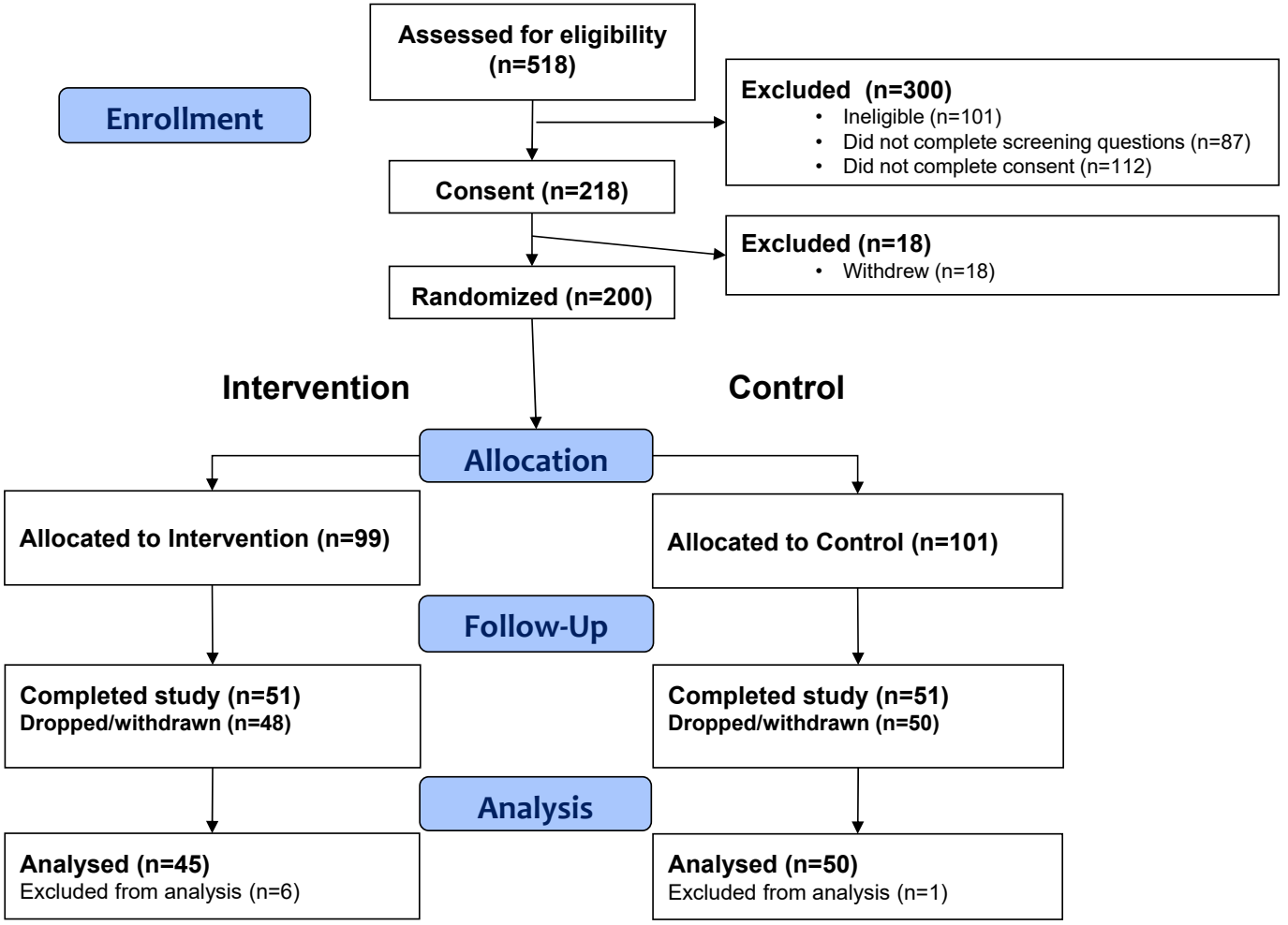
Didactic

Lecture Series

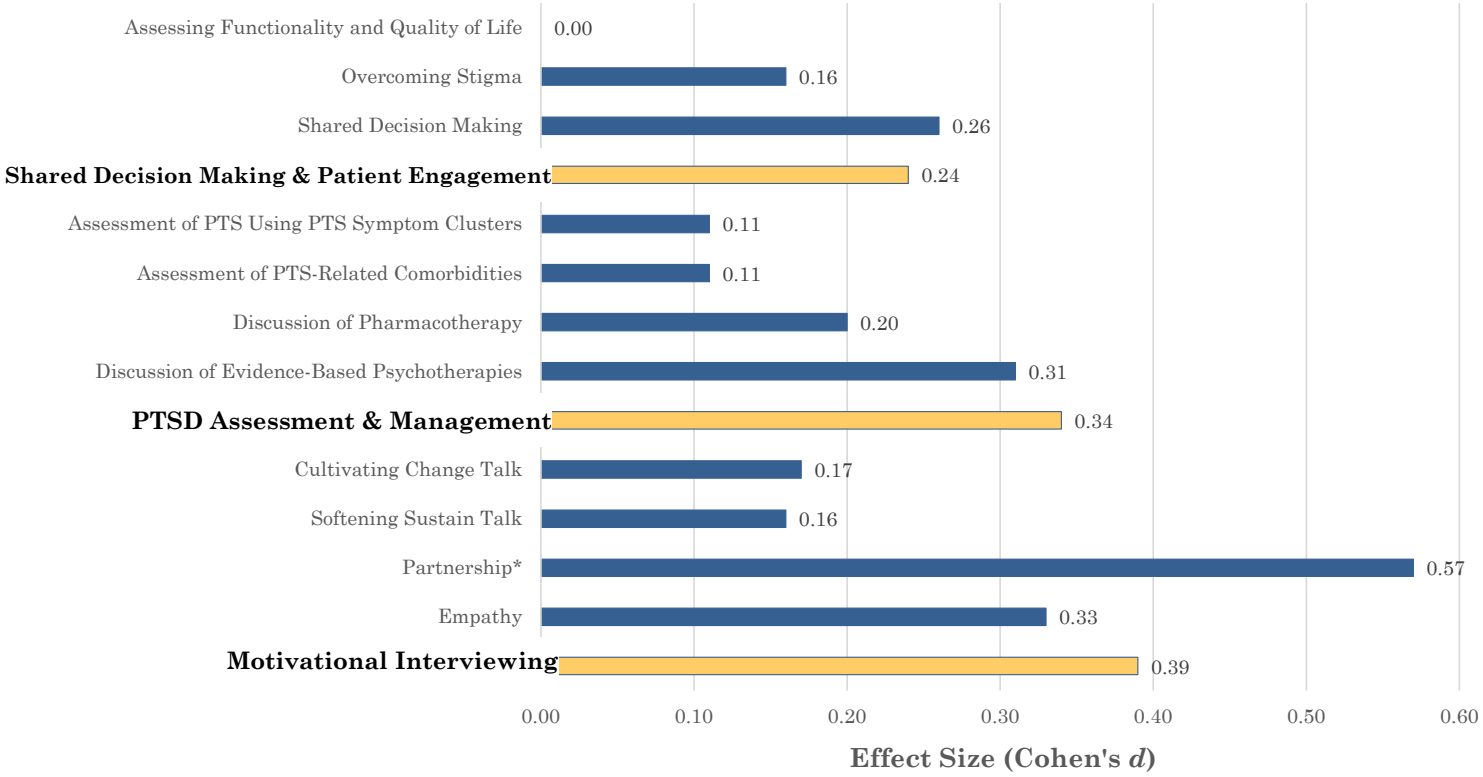
Practicum

A Chance for Providers to Practice their Skills

Study Progress



Improvement in Intervention vs. Control on Standardized Patient Assessment, Baseline to Post-Intervention (N=82)



Summary

- Full trial results pending; will need to weigh feasibility of implementing VW training against clinically significant gains.
  - VW PTSD training was superior to the web-based training in all domains measured in the SP interviews, but we lacked power to show significant differences with a few exceptions.
  - VW format had biggest learning gains in MI, SDM, forming partnerships and expressing empathy
  - Relatively less effective in imparting PTSD-related knowledge

Summary

- Because VW training is synchronous and new for many learners, requires facilitation and technical support.
- As computer technology improves, VW educational interventions may be more feasible.
- Asynchronous web-based PTSD training was easier to implement and less costly but was not as effective as VW immersive experience, particularly in teaching MI, SDM, partnership and empathy.

QUESTIONS??

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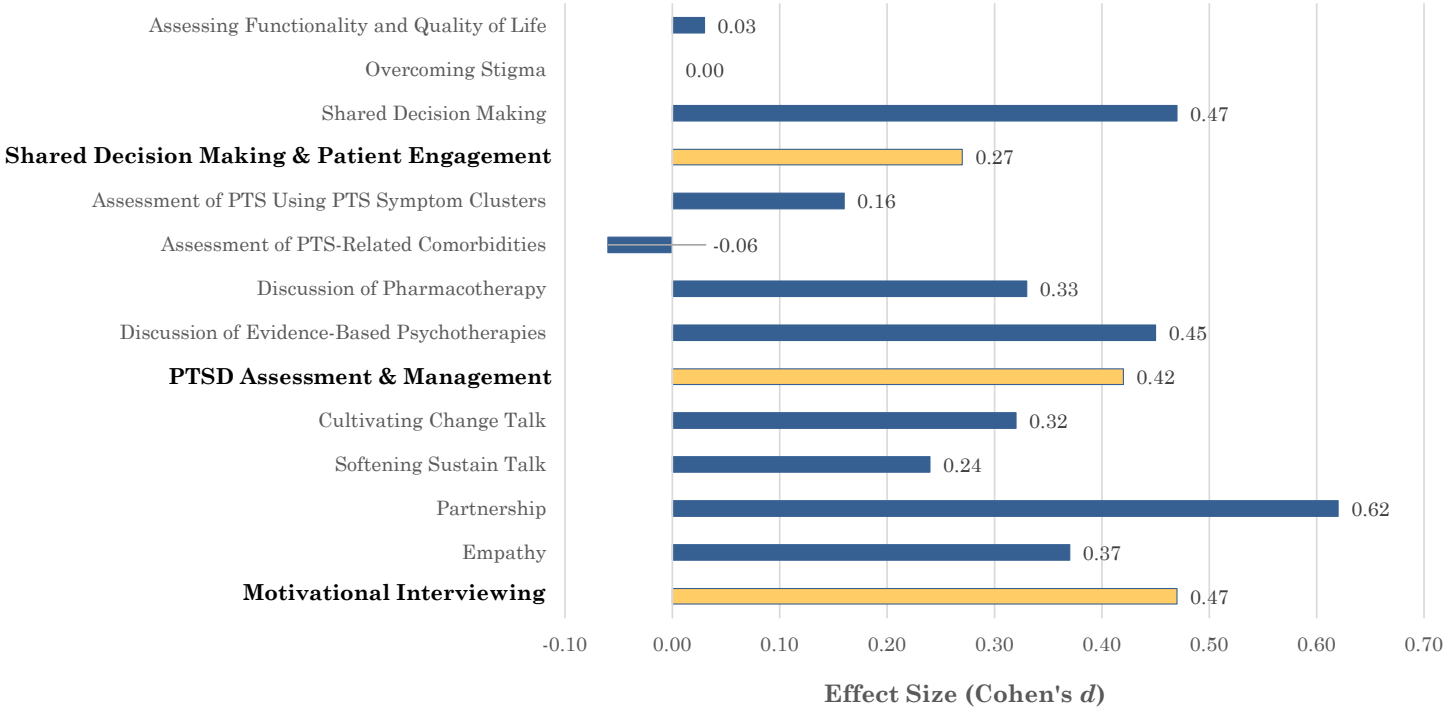
THANK YOU!

Extra Slides

Baseline to Post-Intervention: Intervention Group Change



Updated Web-Based Training

Module Introduction: Overview

Module 1: Detection and Assessment

Module 2: Comorbid Conditions and Related Problems

Module 3: Pharmacological Management of PTSD in Primary Care

Module 4: Psychotherapeutic Interventions for PTSD

Post-Training Practice Case

Using Rapid Qualitative Analysis to Support the Development and Implementation of a Virtual World Training for Primary Care Providers on Caring for Veterans With Posttraumatic Stress Disorder Symptoms

Marianna B. Shershneva, MD, PhD;[1] Christopher J. Koenig, PhD;[2,3] Mathew Douraghi, MA;[2] Eilleen E. Sabino, MPH;[2] Karen H. Seal, MD, MPH[2]
1. Forefront Collaborative, Carmel, Indiana. 2. San Francisco VA Medical Center, San Francisco, California. 3. San Francisco State University, San Francisco, California.

BACKGROUND, PURPOSE, AND METHODS

BACKGROUND

Military veterans with posttraumatic stress disorder (PTSD) symptoms receive care from primary care providers (PCPs) who often lack basic skills in detecting and managing PTSD and using effective communication techniques. We received Department of Defense funding to implement a project titled **"Improving Access to Care for Warfighters: Virtual Worlds Technology to Enhance Primary Care Training in Posttraumatic Stress and Motivational Interviewing."** To address these educational needs, this project involves

1. Developing an innovative virtual world (VW) training for PCPs
2. Comparing its effectiveness with a traditional Web-based course covering similar content. Phase 1 of the project (2016-2017) includes a developmental formative evaluation that is presented in this poster.

PURPOSE

This formative evaluation study employs qualitative methods to explore perspectives of PCPs, educators, healthcare leadership, and information technology specialists on the relevance, acceptability, and feasibility of the VW training. Input from these stakeholder groups is being used to shape the training content and implementation in the VW environment.

METHODS

Data are collected through semi-structured interviews and analyzed using rapid qualitative analysis, a collaborative process involving investigator triangulation, iterative data collection, and analysis procedures to develop an understanding of a target area from multiple stakeholders' perspectives.[1,2]

Data Collection

The interview questions were designed to collect data with respect to four domains:

1. The applicability of training topics for PCPs.
2. The feasibility and acceptability of a synchronous VW training for PCPs.
3. Barriers to and facilitators of VW training implementation.
4. Generalizability for training implementation among PCPs in diverse practice settings with different populations.

All interviews, except one in-person interview, were conducted on the phone and were approximately 30 minutes long. Data included the audio recordings, interviewer notes, and structured summaries of the interviews.

Sample, Recruitment, and Participants

Findings are based on interviews of PCPs stakeholders. Study staff recruited a convenience sample of PCPs affiliated with the Veterans Health Administration by e-mail. The invitation e-mail included a link to a video with an example of a VW training environment for prospective participants who might have limited experience with VW technology.

The 10 PCPs ranged in age and experience and were located in four different states. Half of the participants were females; seven were physicians and the remaining three were nurse practitioners. All were affiliated with the VA system, and while some were clinician educators, all had no or limited experience using VW.

Data Analysis

Structured templates were used to summarize themes from each interview and to include exemplary verbatim quotations.

Rapid Data Analysis: Structured Template Analysis

Interview Date	
Study Participant	
Interview Length	
Interviewer(s)	
Summarizer	
Summary Completion Date	

Relevance of Training Topic and Curriculum

PTS diagnosis and treatment challenges

Current practice of PTS treatment

Experience in motivational interviewing

Shared decision-making for PTS treatment

Feedback about the training—focus on curriculum

Training Delivery: Feasibility and Acceptability

Virtual world experience

Feedback about the training—focus on delivery

Barriers and Facilitators

Acceptance

Facilitators

Barriers

Other factors

Generalizability

Applicability to broad audience

Other

Other

Silent Issues and Researcher Notes

Silent Issues

Connections to Theory

Other Notes

Themes were then categorized into a matrix to display convergent/divergent content, compare findings across participant groups, and document ideas about implications for training curriculum and delivery.

Excerpt From Matrix Table: Interviews With Primary Care Providers (n=10)

Q#	Interview Domain	Implications
DOMAIN 1: RELEVANCE OF TRAINING TOPIC AND CURRICULUM		
Q1	**Difficulties in recognizing and diagnosing PTSD** 1. Having enough time to do mental health-related discovery during medical visit. (P2, P5) 2. PTSD manifests in different ways; differential diagnosis of PTSD with substance abuse, anxiety, alcoholism, and depression other mental health conditions is a challenge. (P2, P3, P4, P8, P9) • Difficulty recognizing actual trauma from imagined trauma due to dementia, psychosis, etc (P3) • Older patients WITH PTSD (P2) 3. Differentiating etiology of PTSD. (P1) • Military experience (combat, military sexual trauma; women or men can experience multiple forms of trauma, etc) • Exposure to other kind of trauma experience (childhood, adult; emotional, sexual, physical, etc) (P1, P4) 4. Failure by the provider to recognize that their patient is a combat veteran. (P4) 5. Failure by the provider to understand that veterans don't need to be deployed to a war zone to develop PTSD. (P4) 6. Veterans not willing to open up about mental health problems during visits. (P2, P5, P7) • Veterans will engage in deception when answering questions by answering "no" to particular questions when the answer should be "yes" (P5) • Veterans show concern over having an mental health diagnosis in their record because of stigma and impact on their status in the military (P1, P5) 7. Available screening tool has limitations. (P5, P6, P10) • Four-question screeners for PTSD that are provided to providers are not enough to capture the entirety of the diagnosis (P5) • PTSD Screener (P6) • Negative PTSD screens may not be correct (P10)	• Reflect in the curriculum that different kinds of trauma may lead to PTSD in veterans • Differential diagnosis of PTSD is a challenge for PCP; is there a room in the curriculum to address it? • "Lack of time" is a universal barrier; it may be helpful to demonstrate to the learners how best practices in screening for/diagnosis of PTSD and managing of patients with PTSD may be time efficient • Providing learners with downloadable practice-oriented tools and/or links to tools will be helpful • Issue for Kaiser/community PCPs in identifying if the patient is a veteran • Invest sufficient time in explaining tell-tale symptoms • Emphasize the role of the PCP: not to diagnose PTSD but rather to manage symptoms of posttraumatic stress to the best of their ability • Focus group: we could add evaluation questions about complexity of training
Q2	**Difficulties in treatment and management of PTSD** 1. Veterans not willing to accept the diagnosis of PTSD and/or refusing treatment for PTSD due to stigma of help-seeking, mental health treatment, etc. (P1) 2. PTSD in homeless people who are substance users. (P3) 3. Recognize that clinical symptoms may be influenced by/associated with PTSD, such as itching. (P1, P9) 4. Getting the veteran to understand that there is a connection between some issues and PTSD (insomnia caused by nightmares caused by PTSD). (P4) 5. Diversity of veterans with PTSD and other comorbidities. (P3) 6. Medical and psychological management is fine but does not get at the root of the problem. Medical/psychological treatment is often a temporary band-aid, what is needed for many veterans is a comprehensive solution to solving mental health problems. (P3)	• Communication techniques are important for provider-patient interaction • Again, explain that the PCP's role is not to diagnose; reframe the symptoms to not imply a disorder

P1, P2, etc=participant code.

The research team presented the matrix to the VW training development team for discussion of themes and implications.

RESULTS AND APPLICATIONS

KEY FINDINGS

1. PCPs acknowledged multiple challenges and factors influencing diagnosis, treatment, and management of PTSD, including differentiating PTSD from other mental health conditions, recognizing the origin of the trauma, limitations of screening tools, stigma associated with a mental health diagnosis, and reluctance of veterans to open up about their mental health problems.

> *[PTSD] can feel a little occult sometimes, kind of hidden behind something that looks more like substance abuse or generalized anxiety or alcoholism or sometimes I just won't get answers during my interview. (P2)*
>
> *I was getting the veteran to acknowledge that they actually have PTSD or symptoms of PTSD. To me, I think, it's the challenge of them; they're in denial. They're in a stage; they're not ready to accept that this could possibly affect them and they could possibly have the diagnosis. (P1)*

2. Regardless of prior training, PCPs expressed varying levels of comfort with either implementing or recommending certain types of care. When asked about which types of treatment they recommend, PCPs overwhelmingly named pharmaceutical interventions.
3. Not one of the 10 PCPs mentioned community engagement/psychosocial approaches to treatment for PTSD.
4. PCPs reported challenges in knowing when to use motivational interviewing and which technique to use.
5. Opinions about acceptance of VW training varied from welcoming this approach to being very skeptical about its value.

> *When I watched the video clip, I was pretty amazed, because it did pretty much look like a video game. The idea of having simulated patients or even just a classroom in the educational environment—it seems very clever and could be additive or even take the place of some of the training that we get in the medical field. (P7)*
>
> *I guess I'm wondering what is the added value over some similar structures like role playing or even things like taping your encounters or standardized patients or something like that. It seems like a lot of effort to create something like that, and what is the additional value of that over some of these other things? I'm a little skeptical. I mean, I love the idea of supporting primary care doctors in learning more about PTSD and getting more comfortable with it, so if that's a way to make that work."(P8)*

6. PCPs made specific suggestions regarding VW training on PTSD and motivational interviewing, such as covering psychosocial aspects of illness, making training fun and engaging, and providing immediate feedback to participants learning new skills.

IMPLICATIONS

Audience Generation

- Include language about advancing motivational interviewing skills rather than introduction to motivational interviewing
- Clarify what the learner can expect from the training
- State technical requirements
- Offer CME credit
- Use testimonials from participants
- Include evidence of the effectiveness of education in VW, presenting training as fun, engaging, and valuable

Delivery

- Create a safe, nonjudgmental environment to practice skills
- Provide synchronous training
- Use case-based learning and role-playing
- Support building community among PCPs
- Provide immediate feedback on learner performance
- Advocate for potential learners to have designated days/times for education in their setting
- Provide learner support
- Involve VA training experts for insight
- Revisit access to training from the VA facilities

Content

- Reflect on different kinds of trauma leading to PTSD
- Address community engagement/psychosocial approaches
- Present comorbid mental health issues
- Include psychosocial aspects of illness
- Explain clinical manifestations of PTSD
- Provide practice-oriented tools
- Demonstrate best practices in this clinical area
- Emphasize the role of PCPs
- Reframe that the posttraumatic stress symptoms to not imply a "disorder"
- Provide a definition of shared decision making

Generalizability

- Consider the implications for content and delivery stated above as a means to increase applicability of the VW training to the broader audience of PCPs
- Consider tailoring the training content to the educational needs and experience of PCPs practicing in the non-VA settings
- Emphasize interprofessional collaborative practice as related to care for patients with PTSD

SCREENSHOTS OF VW TRAINING IN DEVELOPMENT

Customizable Avatars

Virtual Classroom

Virtual Interactivity

LIMITATIONS AND CONCLUSIONS

LIMITATIONS

We used a convenience sample of seasoned PCPs affiliated with the VA, and the results cannot be generalized to the broader population of PCPs. However, generating generalizable results was not the purpose of this study, because it was a formative evaluation. Lack of participant familiarity with a VW environment may have led to participant responses based on insufficient or inaccurate understanding of the VW capabilities.

CONCLUSIONS

1. Rapid qualitative analysis is well-suited for needs assessment, evaluation, and research projects that have a pragmatic need for qualitative data, a constricted timeframe, and rigorous findings.
2. Findings support the need for training for PCPs focused on PTSD and motivational interviewing applied to providing care for patients with PTSD.
3. This formative evaluation generated implications for user engagement, content, training delivery and evaluation, and training generalizability that are being utilized for the VW training development in this project.

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DRAFT METHODS AND RESULTS

Rates of PTSD for service members previously deployed in support of Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn (OEF/OIF/OND) are estimated to range from 14-30%, and may be higher when those suffering from PTS symptoms are also considered. With such a high prevalence of PTSD/PTS, a major concern is this population's underutilization of mental health care. There are multiple patient-level barriers including lack of access, stigma, cultural attitudes, denial, and apathy. In addition, behaviors honed in the warzone and perceived as adaptive by service members, such as avoidance and hypervigilance, come to represent mental health symptoms upon return home and can also lead to avoidance of mental health treatment. The "warrior culture" with its values of strength and resilience, may inadvertently contribute to stigma and beliefs that mental health problems should be handled without mental health support. Finally, critical shortages of mental health professionals, particularly in rural and remote areas, can present insurmountable system-level barriers to care.

In contrast to their underutilization of mental health services, Veterans with mental health disorders disproportionately use VA primary care services compared to combat Veterans without mental health problems. Of note, the majority of these patients first present to PCPs with physical complaints, such as sleep problems, related to PTS. As such, primary care has been coined the "de facto mental health system," as most mental health care is delivered in primary care settings, yet the effectiveness of this care has been plagued by under-diagnosis and inappropriate treatment. Recent gains have been made in training PCPs in the identification and treatment of depression, but there is little to no training in the management of PTS in most primary care settings. PCPs can play a vital role in the initial assessment and treatment of PTS, yet undetected PTS can precipitate a downward spiral of chronic PTSD and co-morbid mental and physical health conditions.

Primary care providers have been shown to lack the necessary training to provide appropriate diagnosis and treatment for PTS symptoms. In addition, they report feeling unprepared and unsure of their ability to communicate with trauma survivors. A retrospective medical record review of patients seen in VA primary care clinics revealed that PCPs had correctly identified PTSD in only 46.5% of 746 Veterans later found to have PTSD by gold standard clinical interview, and only 47.7% had been referred for mental health services[3] Similarly, in a study of 539 primary care patients with anxiety disorders, including PTSD, investigators found that nearly half had not been treated; the most common reason was failure of their PCPs to recommend treatment. Thus, patients with PTS symptoms, including Veterans seen in VA primary care, often go unrecognized and untreated which can eventually lead to the chronic psychosocial, occupational, and functional impairments commonly associated with PTSD.

In response to these challenges, the VA and DoD have implemented programs to improve on the delivery of mental health treatment for OEF/OIF/OND service personnel and Veterans within primary care settings. In 2007, the VA introduced the Primary Care Mental Health Integration (PCMH-I) initiative to co-locate mental health providers in primary care settings. In our study of 526 OEF/OIF Veterans, we found that Veterans who attended an Integrated Care clinic that

offered integrated, co-located primary care and mental health services were more likely to have received a mental health evaluation and one mental health follow-up visit than Veterans who received usual primary care. Nevertheless, retention in mental health treatment was poor; the median number of mental health visits was 1 visit for Veterans in both groups. The Re-Engineering Systems of Primary Care Treatment in the Military (RESPECT-Mil) Program is a Collaborative Care model developed by the DoD which integrates PCPs, care facilitators, and behavioral health specialists in treating PTSD. A recent trial of RESPECT-Mil found that patients receiving Collaborative Care were more likely to have a mental health visit and receive antidepressants, although less than 10% received enough psychotherapy visits to qualify as evidence-based treatment. Moreover, there were no differences between groups in PTSD symptom improvement. Participating PCPs received a one- hour training in diagnosis and treatment of PTSD, but their knowledge was not evaluated. In addition, PCPs were not required to identify or diagnose PTSD, nor assist with engagement in PTSD treatment. The investigators concluded that the Collaborative Care model may have been more effective if there had been more PCP involvement in PTS symptom assessment and diagnosis.

As the studies above illustrate, the presence of mental health providers within primary care does not obviate the need for PCPs to have specific training in PTS. Recent studies examining the effectiveness of integrated care models in primary care suggest that Veterans are still not receiving adequate mental health treatment or demonstrating significant symptom improvement. In a study of VA patients, less than 10% of OEF/OIF/OND Veterans who received PTSD diagnoses received ≥ 9 mental health sessions within 15-weeks in the first year of diagnosis, indicating that most were not receiving evidence-based mental health treatment. Indeed, despite 190 VA PTSD outpatient specialty programs nationwide, nearly two-thirds of Veterans diagnosed with PTSD have not received care through these specialty mental health clinics. Thus, the responsibility for detection and first-line treatment of related PTS symptoms falls squarely to PCPs signaling a clear and pressing need to build PCP competency in PTS-related care and communication techniques.

Unlike mental health clinicians, most PCPs have not been trained to empathically assess for trauma and motivate behavioral change and treatment engagement. Thus, PCPs often lack self-efficacy in assessing and managing PTS symptoms. Motivational Interviewing (MI) is a non-judgmental, non-confrontational patient-centered counseling approach aimed at eliciting and strengthening the patient's intrinsic motivation to change his or her behavior. MI is based on the **Transtheoretical Model of Change** which posits that patients move in graduated stages from pre-contemplation through contemplation to action. The construct of ***"readiness to change"*** is at the center of this model and two elements: **"importance"** and **"self-confidence"** contribute to readiness to change. A specific MI strategy is the use of the "**Readiness Ruler**" to gauge an individual's perception of the importance, their confidence, and readiness on a scale from 0 to 10 to make behavioral changes such as engaging in mental health treatment. MI has a strong evidence-base in primary care settings and can help PCPs respond to patient ambivalence about changing PTSD-related behaviors, such as substance abuse and violent behavior and encourage

mental health treatment engagement. Studies have shown that PCPs can be trained to proficiency to use MI techniques, like the Readiness Ruler, to improve communication with patients to promote PTS-related behavioral change and engagement in care.

Given time and cost constraints, geographic barriers, and scheduling challenges, the use of the internet for PCP training may represent an ideal cost-effective educational tool, particularly for large national health care systems like the VA, DoD and Kaiser-Permanente in which PCPs are located throughout the country, and in some cases, overseas. Recent web-based training programs for PCPs on other topics, such as managing intimate partner violence, at-risk drinking, and chronic pain have shown that medical education provided over the web can demonstrably improve clinical competency. A meta-analysis of 201 web-based continuing medical education (CME) trainings showed large effect sizes for improved self-reported knowledge, skills, and clinical practice behaviors compared to no educational offerings and showed comparable effects to those observed resulting from in-person trainings. In addition CME programs that mix didactic and interactive activities and provide an opportunity to practice skills, including audit and feedback, have the largest effect (d= 0.67) on clinician behavior, and patient health outcomes. A large meta-analysis published in *JAMA* demonstrated that very few CME programs actually achieve this level of interactivity however, which ultimately negatively impacts patient outcomes. This is precisely why there is a need for innovations in medical education like the use of VW technology which promotes highly interactive educational experiences.

Virtual World (VW) technology is used in some of the most popular and engaging commercially-available video games and VWs are increasingly viewed by educators and researchers as learning environments with tremendous potential for a new medical education pedagogy. Several recent pilot studies have demonstrated that VW training programs enhance learning outcomes beyond that provided by more traditional online or face-to-face CME activities. A *Virtual World*, also known as a *3-D multiuser virtual environment*, is a computer-based, simulated multimedia environment, which offers graphical representation of a physical space where real people use avatars, their digital self-representations, to interact with each other and objects.[7] An avatar may resemble the person's appearance or look different. Navigated by the actual person, it moves, touches objects, makes gestures, and communicates with other avatars verbally and through typing in a chat box. A virtual environment, which can be anything from a beach to a museum, is usually expressed through color- and detail-rich graphics. More than 250 Virtual Worlds have emerged in the past decade, including virtual classrooms of several major universities. Virtual World technology is also increasingly being used in learning about mental health problems (such as PTS) and doctor-patient communication techniques. The following are specific features of VW technology as it relates to a PTS training for PCPs:

- VW technology can be leveraged to simulate a traumatic experience (Virtual PTSD experience) so that civilian PCPs can better appreciate and have empathy for what their patients experienced.

- VW can also be used to simulate mental health symptoms, such as re-experiencing (nightmares or flashbacks), so that PCPs are not just taught the symptoms, they actually experience them.
- PCPs can practice Motivational Interviewing (MI) techniques such as the Decisional Balance exercise by literally having their avatar weigh pros and cons (each represented by a block) on a stylized virtual scale. Embodied practice through an avatar can reinforce learning.

Virtual environments provide rich immersive experiences that are highly visual, memorable, interactive, and impactful, giving distance learners the feeling of actually "being there" which can enhance learning beyond traditional web-based learning and make learning far more durable. In addition, Virtual Worlds allow learners to remain at convenient locations (their homes or work), overcome geographic barriers, and save on travel expenses, thus being cost-effective for large national health care systems with clinicians located throughout the US and overseas (DoD).Participants learn in a synchronous virtual environment that allows them to interact with instructors as well as practice new skills with Standardized Patients and each other, giving and receiving real-time feedback, which is ideal when practicing communication techniques such as MI. In addition, these practice MI sessions can be easily videotaped and uploaded to a sharepoint site as homework, where learners can critique themselves and become motivated to improve in the next training session. Software capabilities can be leveraged to design additional asynchronous interactive learning activities (like the decisional balance described above) to maximize learning and convenience. Asynchronous experiences can be accessed at any time, regardless of instructor presence, and can facilitate "learning by doing". When entering a learning environment as an "avatar," an anonymous, self-styled representation of oneself, the PCP learner may feel more comfortable taking risks in learning new communication techniques. The challenge for VWs are technical problems associated with hardware and software requirements, bandwidth, and firewalls, and a relatively steep learning curve to acquire technical skills. Nevertheless, reports on VW educational activities show evidence of learner satisfaction with their in-world experience. We made the design decision to use VW technology rather than video-teleconferencing because of the unique affordances of VW technology to push the envelope on immersive simulations and experiential learning and because of the pedagogical advantage of repeated immersive role-play practice with avatar Standardized Patients to drive home the subtle, yet vital structure of a well-constructed MI conversation.

The overarching goal of this proposed project is to improve our ability to build competency among a primary care workforce to better detect and manage posttraumatic stress (PTS) symptoms and motivate treatment engagement in our warfighters. Specifically, we conducted a randomized controlled pragmatic effectiveness trial (RCT) with implementation-focused evaluation to compare two web-based medical education trainings for the assessment and management of PTS in warfighters and veterans in primary care settings--traditional online training vs. the VW-enhanced training).

METHODS

Participants and Recruitment

Primary care providers (PCPs) were recruited via email blasts to clinicians across the U.S. included in the University of California Continuing Medical Education (CME) listserve. Potential participants were also recruited via emails to primary care clinic leads in the Department of Veterans Affairs (VA), Department of Defense, community healthcare systems, and university affiliates, who could then forward recruitment emails to their staff. In both cases, interested PCPs were directed to click on a hyperlink to complete a brief eligibility screen. Eligibility criteria included: 1) English-speaking primary care providers (e.g., licensed internists, family practitioners, nurse practitioners, physician assistants and/or trainees in these fields) currently practicing or being precepted in adult medicine in the U.S., U.S. protectorates or Canada.; and 2) provider or trainee panels included at least five active duty personnel or war veterans. Participants were excluded if they: 1) previously participated in the pilot online(posttraumatic stress (PTS) training that served as the control for this study; 2) lacked sufficient time to participate in the required training sessions and evaluations; 3) did not have adequate computer or internet access; 4) were retired or planning to retire during the study; 5) were vision- or hearing-impaired or other had another disability that precluded the use of a computer or telephone. The study was approved by the Institutional Review Board of the University of California, San Francisco, and the Research Protection Program at the San Francisco VA Health Care System. Participants received continuing medical education credits (CME) for their participation.

Outcomes Assessment

Provider Self-Report Measures:

Outcomes assessment were conducted for PCP participants in both arms. In the Control arm, at the conclusion of the online training, participants were directed to link to a web-based Qualtrics data management program that allowed them to complete the provider self-report measures. Participants in the VW training were emailed a link to the online self-report measures at the conclusion of the second (and final) VW training session and asked to complete the post-training assessment within one week. Just prior to 90 days after completing either training, providers were emailed a link to complete the 90-day follow-up self-report measures. With the exception of the System Usability Scale, these self-report measures were non-standard because no specific measures have been developed to evaluate the effectiveness of a training for PTS and MI for PCPs. We successfully used each of these self-reported measures previously however in our prior online PTSD training study and have published the results. Provider self-report measures are described in detail below:

Sociodemographics/ Practice Characteristics: This section included information about participants' sociodemographics and profession, level of training, practice or training environment, and estimated proportion of military service personnel and veterans in PCPs' patient panels.

Provider Satisfaction with Training (Feedback-Quantitative and Qualitative): Immediately following the training and 90 days post-training, participants were asked to rate aspects of the trainings on a 4-point Likert scale. Participants were asked to provide open-ended qualitative

feedback including enjoyability versus learner burden, strengths and weaknesses, as well as specific comments about the utility and relevance of training content to their own clinical practice. We will also solicited detailed feedback about technical aspects of the training.
System Usability Scale (SUS): The SUS is a brief, reliable and valid instrument. The SUS has been tested on a variety of different technologies, being the most used questionnaire for measuring perceptions of usability. The SUS consists of 10 statements that are scored on a 5-point Likert scale with higher scores reflecting greater usability (maximum score of 100). The SUS possesses good psychometric qualities. Internal consistency has been demonstrated through high correlations across items with a Cronbach's alpha's > 0.90. The SUS shows no gender bias and has been shown to be concurrently valid against other measures of satisfaction. We will use the version of Lewis 2009[60] to compare the overall usability of the two trainings. A mean SUS score of 70 indicates acceptable usability in health care settings.
PTS Knowledge: For our prior training assessment, we initially constructed a total of 10 multiple-choice knowledge questions that tested knowledge of the content in each of the training modules. Clinical problem-solving questions used patient scenarios. Questions were then reviewed by an outside expert in PTSD and piloted on the first six PCP participants who completed the training. Consistent with test construction theory, questions were deleted if a high rate (> 60%) of respondents answered them incorrectly. The final knowledge assessment consisted of eight items. Correlations of questions assessed ranged from .42 to .57, indicating convergence. We will use the revised 8-item knowledge scale for the proposed study and modify as needed to address changes made to this curriculum.
PTS Clinical Skills Self-Efficacy: Twelve questions will assess PCPs' self-reported self-efficacy regarding PTSD-related skills targeted in the training. Items are scored using a Likert scale from 1 to 4 with higher scores indicating greater self-efficacy. Examples of questions include an assessment of comfort level in using a screening measure for PTSD in primary care, comfort in differentiating PTSD from acute stress disorder, comfort in prescribing medications for PTSD, and comfort in describing psychotherapeutic options for PTSD.
PTS and MI Clinical Skills Application to Clinical Practice: Participants will be asked 90 days after the training whether or not they have cared for active duty service personnel or Veterans since the training and the proportion of cases in which they applied training concepts and skills.

Standardized Patient (SP) Interviews and Coding Rubric (**see Figure 1 below)**
PCP participants completed a phone-based interview with a standardized patient. Standardized patients were trained actors portraying veterans with PTS symptoms. Six veteran cases were developed and randomly assigned to standardized patient actors to use on their calls to assess the PTS and Motivational Interviewing (MI) skillset of clinician participants. Standardized patient interviews were coded. The coding system consisted of three domains (**see Table 1 below**). **Domain A** measured clinician **Shared Decision Making and Patient Engagement** and consisted of three subdomain categories by which PCPs were assessed: 1) Assessing Functionality and Quality of Life; 2) Overcoming Stigma; and 3) Shared Decision Making. **Domain B** measured **PTS Assessment and Management** and consisted of four subdomain categories: 1) Assessment of PTS Conditions; 2) Assessment of PTS Co-Occurring Conditions; 3) Discussion of Pharmacotherapy; 4) Discussion of Evidence-based Psychotherapy. **Domain C** measured clinician participant **Motivational Interviewing (MI) skills**, drawn from the Motivational Interviewing Treatment Integrity (MITI) behavioral coding system and consisted of

four subdomain categories: 1) Cultivating Change Talk; 2) Softening Sustain Talk; 3) Partnership; 4) Empathy. All coders received training in the coding system and attended weekly meetings where a session was group-coded to prevent coder drift. All sessions were dummy-coded and coders were masked to session order (i.e., they were blinded as to whether they were coding a baseline, post-training or follow-up SP interview).

Figure 1

Domain	Description	Analysis
A. Shared Decision-Making and Patient Engagement		
Assessing Functionality and Quality of Life*	Measures extent to which the clinician actively engages with the patient to assess functionality and quality of life, including impact of symptoms on patient's overall quality of life.	This item was removed from analyses due to low inter-rater reliability.
A. Overcoming Stigma	Measures clinician attempts to address PTS stigma including eliciting patient's own concerns about stigma	These two items are collapsed into single item, *Overcoming Stigma & Shared Decision Making*, in Table 2 analyses.
A. Shared Decision Making	Use of following evidence-based practices to engage and partner with patient: • Seeks patient participation • Assesses patient values and preferences • Helps explore and compare options • Reaches a decision with patient	
B. PTS Symptom Assessment and Management		
B1. Assessment of PTS Symptoms	Clinician inquiries about presence of following symptoms: • Past traumatic events • Intrusions • Avoidance • Negative cognitions and mood • Alterations in arousal and activity	These two items are collapsed into single item, *B1. PTS Symptoms & Co-Occurring Conditions*, in Table 2 analyses.
B1. Assessment of PTS Co-Occurring Conditions	Clinician inquiries about presence of symptoms of following conditions: • Suicidality and other mental health conditions • Substance abuse disorders • Neurocognitive problems • Physical health conditions • Sleep problems	
B2. Discussion of Pharmacotherapy	Clinician discusses following medication options: • Identifies and offers pharmacologic treatment for PTSD symptoms • Explains purpose of medications for PTSD symptoms • Reviews risks and side effects • Reviews effectiveness of combination of medications and psychotherapy • Identifies and shares non-pharmacological treatments	These two items are collapsed into single item, *B2. Discussion of Pharmacotherapy & Discussion of Psychotherapies*, in Table 2 analyses.
B2. Discussion of Evidence-Based Psychotherapies	Clinician discusses psychotherapy options and introduces and describes different EBPs for PTSD	

C. Motivational Interviewing		
Cultivating Change Talk*	Measures extent to which the clinician elicits and reinforces patient language toward behavior change.	This item was removed from analyses due to low inter-rater reliability
Softening Sustain Talk*	Measures extent to which clinician avoids a direct focus on patient reasons against making a behavior change.	This item was removed from analyses due to low inter-rater reliability
C. Partnership	Clinician actively fosters power sharing and elicits patient's contributions throughout interaction.	These two items are collapsed into single item, *C: MI: Partnership and Empathy*, in Table 2 analyses.
C. Empathy	Clinician demonstrates understanding of patient's perspective and experience.	

Our team of coders coded 272 SP interviews. Approximately 20% of all sessions (N=54) were randomly selected for double-coding to calculate inter-rater reliability. As described in **Table 3**, inter-rater reliability was measured across the three coders and revealed modest agreement for all but three variables (Assessing Functionality and Quality of Life, MI: Cultivating Change Talk and Softening Sustain Talk), which were removed from subsequent analyses. Sub-domain items were collapsed into the following categories: A. Overcoming Stigma & Shared Decision Making; B1. PTS Symptoms & Co-Occurring Conditions; B2. Discussion of Pharmacotherapy & Discussion of Psychotherapies; C: MI: Partnership & Empathy) for analyses (see **Table 2**).

Qualitative Interviews with Primary Care Provider Learners

We conducted qualitative interviews with 22 PCPs to learn about their experiences with the Virtual World PTSD training. Of those interviews, 9 PCPs were from the control arm (web-based training) and 13 PCPs were from the intervention arm (VW training). Each interview was analyzed by two trained analysts using rapid analysis procedures. Analysts listened to each interview audio file and then populated a summary of interview content into an Excel-based matrix organized into topical domains derived from the interview guide. The analysts then collaborated to review all individual interview summaries and to develop an integrated master matrix of identified themes and exemplary quotations and narratives.

Data Analysis

Using paired t-tests, we compared the within-treatment group change in the proportion of correctly answered PTS-related knowledge questions from baseline to both the post-training and follow-up periods. For the post-training and follow-up periods, we conducted a difference-in-difference (DD) analysis to test for differences across the treatment groups (virtual world vs web-based training). The DD analysis allowed us to compare whether the magnitude of change across the treatment arms was similar over time. A sensitivity analysis was conducted that compared the change in PTS knowledge based on the 10 PTS questions to that with only the 9 questions that respondents correctly answered at least 60% of the time. We followed a similar two-stage approach in analyzing the self-confidence, self-efficacy, and standardized patient (SP) items. However, since self-confidence was measured on a continuous scale (0-100), and self-efficacy and SP on an ordinal scale (1 = low, to 4 = high), we compared the mean change in these items over time. We used paired t-tests for the self-confidence and self-efficacy items. Since the 11 SP items consisted of subgroupings of items designed to measure the same underlying psychometric construct, we used standard t-tests within the study arms and aggregated items within concept. Additionally, for the SP items, we conducted an inter-rater reliability (IRR) analysis (Hallgren, 2012) to ensure raters were consistently measuring concepts.

RESULTS

Our study team recruited and screened 518 providers for eligibility (**see Figure 2**). Of the 518 providers, 200 were eligible and were randomized to one of two PTS trainings: Virtual Worlds training (Intervention, N=99) or Web-based training (Control, N=101). In the Virtual Worlds condition, 48 participants were not able to complete the training because 23 PCPs did not follow-up or respond after enrollment, 14 dropped out due to lack of time, 4 PCPs had IT issues that precluded their participation in the VW training and 7 had other reasons. In the web-based training arm, 40 PCPs did not follow-up after enrollment, 4 cited lack of time, 2 were lost to follow-up after some participation and 4 had other reasons for dropping out. In sum, a total of 102 PCPs learners completed some follow-up assessment during the trial: 51 participants in the VW training and 51 in the web-based training either completed the self-report end-of-training or follow-up survey and/or participated in a SP interview after the training. As displayed in **Table 1**, our sample was largely comprised of female PCPs (72%). Most participants were physicians (57%), followed by advanced practice nurses /physician assistants (29%) and other primary care professionals (18%). Most participants (66%), had completed their professional training 10+ years ago.

Participant Self-Report Items

There was a significant increase in PTSD knowledge immediately post-training within both treatment groups without a significant between-group difference: mean difference in the percent correctly answered was 10%, 95% CI = [5%, 15%] for PCPs in the web-based training and 10.1%, 95% CI = [5.3% , 15%] for those in the VW training (**Table 2)**. At roughly 90 days follow-up, respondents in the web-based training maintained their PTSD knowledge, but the mean difference in the percent correctly answered dropped to 6.2% (95% CI = [0.32% - 11.99%]), whereas in the VW group, the mean increase at follow-up was mostly retained (mean increase = 10.3%, 95% CI = [5.34%, 15.19%]). DD analysis revealed that there was no significant difference between the groups at any time period. A sensitivity analysis performed by removing one question incorrectly answered by 58% of respondents after training did not alter the results. There was a significant increase in self-confidence across both groups post-training with a mean increase of 23.4 (95% CI = [18.8 - 28]) for the web-based training group; and 20.5 (95% CI = [14.6, 26.4]) for the VW group (**Table 2**). Similarly, in the follow-up period both groups maintained an increase in self-confidence with an increase of 21.8 (95% CI = [16.3, 27.34]) for the web-based training group and 24.3 (95% CI = [18.95, 29.65]) for the VW group. As with the DD analysis of the PTSD questions, there was no significant difference between the groups over time. There was a decrease in self-efficacy across both groups, but no significant difference between groups (**Table 2**). In the post-training period, the web-based training group had a slight mean decrease of -0.1 (95% CI = [-0.32, 0.04]) while the VW group experienced a mean decrease of -0.2 (95% CI = [-0.34, -0.06]). Similarly, at follow-up both groups experienced slight decreases: -0.3 (95% CI = [-0.53 - -0.17]) in the web-based training group, and -0.3 (95% CI = [-0.4 - -0.12]) in the VW group. As with the DD analysis for the other measures, there was no significant difference between the groups over time.

Standardized Patient (SP) Interviews

For the standardized patient items, the inter-rater reliability (IRR) was moderate for most items (**Table 4**), however the 95% assessing Functionality and Quality of Life, Cultivating Change

Talk and Softening Sustain Talk included zero and were removed in a sensitivity analysis. Primary analysis of the SP items revealed that there was no significant change within or across training groups in the domains of Overcoming Stigma and Shared Decision Making and PTS Symptoms and Co-Occurring Conditions at post-training or follow-up (**Table 3**). There was a significant within-group increase in the VW group from baseline to post-training and follow-up assessments in Discussions of Pharmacotherapy and Psychotherapy skills. There was also a significant increase in the average of MI Skills in Partnership and Empathy within the VW group post-training: 0.65 (95% CI = [0.3, 1]). Additionally, the DD for the comparison of the average change in MI-related skills across groups post-training was also significant: 0.72 (95% CI = [0.2, 1.2]). In sensitivity analyses removing the SP items with low IRRs, there was a significant increase in the aggregated Discussions of Pharmacotherapy and Psychotherapy skills items (mean difference = 0.809, 95% CI = [0.09, 1.528]) and MI-related items (mean difference = 0.73; 95% CI = [0.199, 1.261]) in the VW group post-training. This change was maintained at the follow-up timepoint within the VW group for the Discussions of Pharmacotherapy and Psychotherapy skills items (mean difference = 1.041, 95% CI = [0.191, 1.892]).

Qualitative Findings from PCP Learners

A number of providers reported working in settings with vulnerable patient populations outside of the VA, or in settings with patients who have experienced considerable trauma (including both their veteran and non-veteran patients). They noted the wide prevalence of PTSD in their patient populations and the need to better train providers working across a variety of practice settings. There were mixed perspectives on the value of the virtual world, and whether this particular mode of delivery was worth it when considering the time to install/set up the program and time spent trying to navigate inside the virtual world using their avatars. Generally, participants thought the novel format made the training memorable but was not necessarily more effective than other formats. Several participants described the virtual world as “clumsy” or “inefficient”. Nevertheless, participants overwhelmingly found the content of the training valuable. The interactive and applied components of the training distinguished it from other trainings they had participated in previously. For deeper learning and retention, some found that this different modality was helpful given differences in learning styles. Perspectives were mixed on whether they would choose VW format again. Some liked the interactive aspects of the VW format, while others liked the greater flexibility and reduced time commitment of the more traditional web-based option. Most people were signed up primarily to learn about the topic and not because of the technology offered. Participants generally thought that any provider who interacts with patients could likely benefit from this training, from primary care providers to emergency department providers and even specialty care. Some noted that even though MH providers are likely to have training in PTSD, they might not have much training in MI and could still benefit from this interactive MI training.

Figure 2. Consort Diagram of Participant Enrollment and Retention

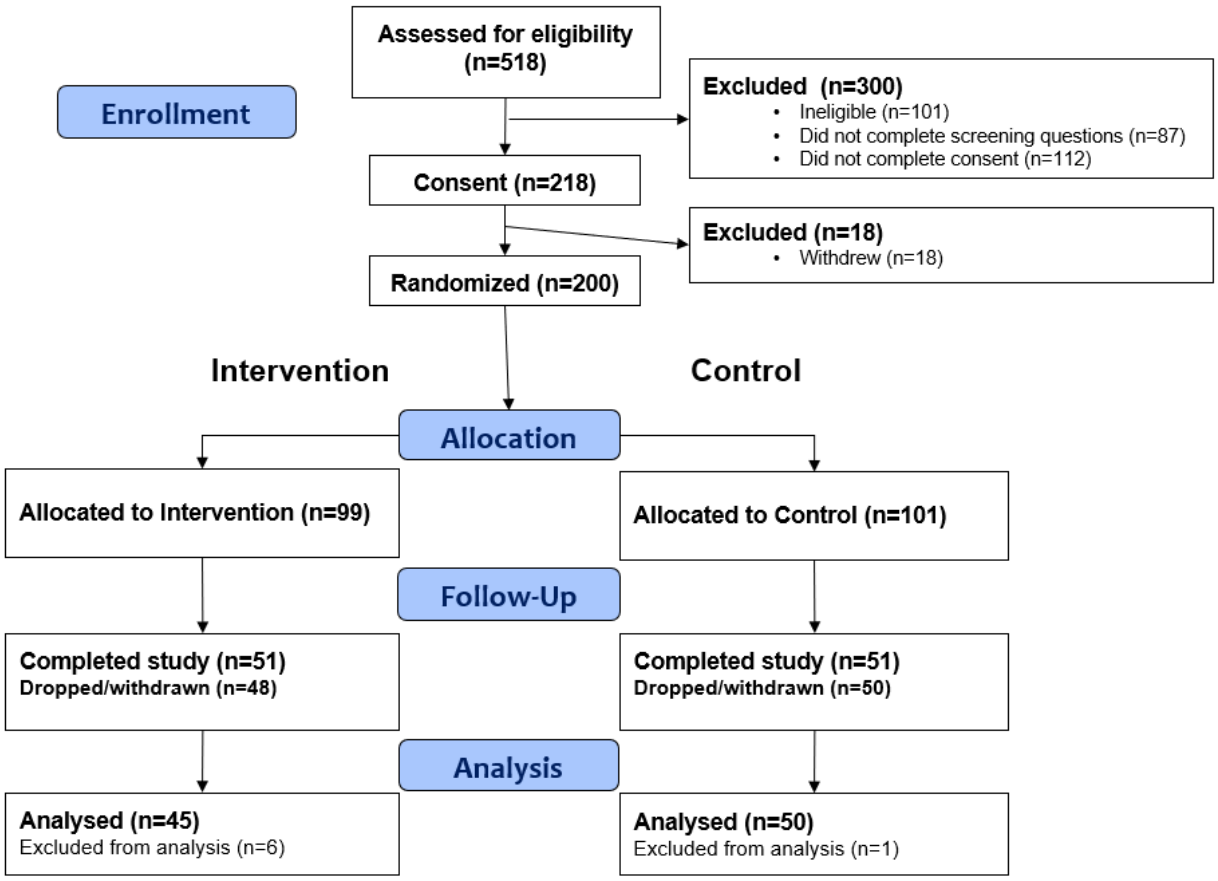

Table 1. Respondent Demographics and Baseline Characteristics by Treatment Arm (Web-Based training vs Virtual World training)

	Overall	VW	Web	p-value
N	107	51	56	
Female (%)	72 (67.9)	32 (64.0)	40 (71.4)	0.542
Profession (%)				0.237
Physician	57 (53.3)	31 (60.8)	26 (46.4)	
Nurse/PA	31 (29.0)	11 (21.6)	20 (35.7)	
Other/Trainee	19 (17.8)	9 (17.6)	10 (17.9)	
Years since training completed (%)				0.467
0-5 Years	23 (21.7)	9 (18.0)	14 (25.0)	
5-10 Years	17 (16.0)	10 (20.0)	7 (12.5)	
10+ Years	66 (62.3)	31 (62.0)	35 (62.5)	
Prior VA or DOD Experience (%)	13 (12.3)	5 (10.0)	8 (14.3)	0.708
Prior web training (%)	86 (81.1)	40 (80.0)	46 (82.1)	0.974
Work Experience (%)				
Non-Combat Trauma	103 (97.2)	49 (98.0)	54 (96.4)	1
Combat Trauma	73 (68.9)	35 (70.0)	38 (67.9)	0.978

Table 2: Percent of PTSD questions correctly answered and mean self-efficacy and self-confidence across the study periods and treatment arms (***Web-Based*** training vs ***V***irtual ***W***orld training).

		Baseline	Post Training			Follow-up		
Metric		**Mean Score % (SD %)**	**Mean Score % (SD%)**	**Mean Change % (95% CI %)**	**DD % (95% CI %)**	**Mean Score % (SD %)**	**Mean Change % (95% CI %)**	**DD % (95% CI %)**
PTSD Knowledge	Web	68.9 (19.0)	82.2 (12.4)	10.0 (5.0, 15.0)***	0.1 (-6.8, 7.0)	76.9 (18.2)	6.2 (0.3, 12.0)*	4.1 (-3.4, 11.6)
	VW	71.0 (14.6)	81.7 (17.2)	10.1 (5.3, 15.0)***		80.5 (15.8)	10.3 (5.3, 15.2)***	
Self-Efficacy	Web	2.2 (0.5)	2.0 (0.6)	-0.1 (-0.3, 0.1).	-0.1 (-0.3, 0.2)	1.9 (0.5)	-0.3 (-0.5,-0.2)***	0.1 (-0.1, 0.3)
	VW	2.1 (0.6)	1.9 (0.5)	-0.2 (-0.3, -0.1)**		1.9 (0.5)	-0.3 (-0.4, -0.1)***	
Self-Confidence	Web	61.3 (19.9)	85.6 (10.5)	23.4 (18.8, 28.0)***	-2.9 (-10.3, 4.5)	84.8 (12.4)	21.8 (16.3, 27.3)***	2.5 (-5.1, 10.0)
	VW	54.0 (19.5)	76.0 (15.7)	20.5 (14.6, 26.4)***		78.8 (12.7)	24.3 (19.0, 29.7)***	

Significance codes: <0.001 *** 0.01 ** 0.05 *

Table 3. Change in domain scores in standardized patient assessments across the study periods and treatment arms (***Web-Based*** training vs ***V***irtual ***W***orld training).

		Baseline	Post Training			Follow-up		
Metric		**Mean Score (SD)**	**Mean Score (SD)**	**Mean Change (95% CI %)**	**DD % (95% CI %)**	**Mean Score (SD %)**	**Mean Change (95% CI %)**	**DD (95% CI %)**
Standardized Patient Items								
Composite Coding Items								
A. Overcoming Stigma & Shared Decision Making	Web	2.09 (1.14)	2.00 (1.29)	-0.09 (-0.64, 0.46)	0.64 (-0.2, 1.48)	1.67 (0.89)	-0.43 (-1.04, 0.19)	-0.09 (-1.36, 1.19)
	VW	2.01 (1.22)	2.56 (1.26)	0.55 (-0.17, 1.27)		2.14 (1.51)	0.13 (-0.78, 1.04)	
B1. PTS Symptoms & Co-Occurring Conditions	Web	3.34 (0.82)	3.30 (0.79)	-0.04 (-0.40, 0.31)	0.09 (-0.57, 0.75)	3.00 (0.95)	-0.34 (-0.97, 0.28)	0.03 (-0.89, 0.95)
	VW	3.08 (1.08)	3.12 (1.02)	0.05 (-0.54, 0.63)		2.86 (1.03)	-0.22 (-0.85, 0.41)	
B2. Discussion of Pharmacotherapy & Discussion of Psychotherapies	Web	2.19 (1.10)	2.53 (1.20)	0.35 (-0.17, 0.86)	0.46 (-0.37, 1.30)	2.33 (1.78)	-0.34 (-0.97, 0.29)	0.43 (-0.92, 1.79)
	VW	1.82 (1.27)	2.62 (1.26)	0.81 (0.09, 1.53)*		2.86 (1.41)	1.04 (0.19, 1.89)*	
C. MI: Partnership & Empathy	Web	2.08 (1.04)	1.97 (1.19)	-0.11 (-0.62, 0.40)	0.84 (0.07, 1.62)*	1.92 (1.16)	-0.16 (-0.93, 0.61)	-0.43 (-1.62, 0.75)
	VW	1.89 (1.17)	2.62 (0.89)	0.73 (0.20, 1.26)**		2.14 (1.46)	0.25 (-0.63, 1.12)	

Significance codes: <0.001 *** 0.01 ** 0.05 *

Table 4. Inter-rater reliability (IRR) and central tendencies (Mean and SD) of coding items

		Baseline		Post-training		Follow-up	
	IRR	Web	VW	Web	VW	Web	VW
Shared Decision Making and Patient Engagement							
Overcoming Stigma	0.59 (0.4, 0.7)	2.49 (0.85)	2.46 (0.89)	2.36 (0.81)	2.58 (0.76)	2.31 (0.57)	2.46 (0.90)
Shared Decision Making	0.41 (0.2, 0.6)	3.55 (1.31)	3.48 (1.21)	3.70 (1.00)	4.13 (1.02)	3.64 (1.20)	4.00 (1.10)
PTS Symptom Assessment and Management							
Assessment of PTS Symptoms	0.74 (0.6, 0.8)	4.45 (0.75)	4.18 (1.05)	4.52 (0.76)	4.37 (0.91)	4.56 (0.72)	4.15 (0.88)
Assessment of Co-Occurring Conditions	0.55 (0.4, 0.7)	4.28 (0.89)	4.00 (1.03)	4.07 (0.85)	4.03 (0.88)	4.28 (0.79)	3.95 (0.84)
Discussion of Pharmacotherapy	0.66 (0.5, 0.8)	3.06 (1.31)	3.05 (1.44)	3.34 (1.22)	3.47 (1.13)	3.54 (1.23)	3.46 (1.40)
Discussion of Psychotherapies	0.55 (0.4, 0.7)	3.13 (1.26)	2.64 (1.24)	3.27 (1.30)	3.26 (1.11)	3.31 (1.24)	3.10 (1.26)
Motivational Interviewing							
Partnership	0.46 (0.3, 0.6)	2.75 (1.09)	2.52 (1.1)	2.82 (1.02)	3.24 (1.00)	2.82 (1.02)	3.05 (1.14)
Empathy	0.33 (0.1, 0.5)	3.15 (1.13)	3.12 (1.03)	3.18 (1.02)	3.50 (0.89)	3.28 (1.00)	3.49 (1.03)