EIRB Protocol Template (Version 1.5)

1.0 General Information

***Please enter the full title of your study:**

Can Virtual Reality Reduce Patient's Pain, Improve Patient's Experience, and Reduce Procedure Related Anxiety with Venipuncture? A Randomized Control Trial.

***Please enter the Protocol Number you would like to use to reference the protocol:**

19-35
* This field allows you to enter an abbreviated version of the Protocol Title to quickly identify this protocol.

Is this a multi-site study (i.e. Each site has their own Principal Investigator)?

No

Does this protocol involve the use of animals?

○ Yes ◉ No

2.0 Add Site(s)

2.1 List sites associated with this study:

Primary Dept?	Department Name
◉	**Army** - Carl R. Darnall Army Medical Center (CRDAMC)

3.0 Assign project personnel access to the project

3.1 *Please add a Principal Investigator for the study:

Perdue, Matthew Jordan, MPAS

Select if applicable

☑ Student ☐ Site Chair
☐ Resident ☑ Fellow

3.2 If applicable, please select the Research Staff personnel:

A) Additional Investigators

B) Research Support Staff

3.3 *Please add a Protocol Contact:

Perdue, Matthew Jordan, MPAS

The Protocol Contact(s) will receive all important system notifications along with the Principal Investigator. (i.e. The protocol contact(s) are typically either the Protocol Coordinator or the Principal Investigator themselves).

3.4 If applicable, please select the Designated Site Approval(s):

Add the name of the individual authorized to approve and sign off on this protocol from your Site (e.g. the Site Chair).

4.0 Project Information

4.1 * Has another IRB/HRPP reviewed this study or will another IRB/HRPP be reviewing this study? If Yes, answer the questions according to the IRB/HRPP Determination.

○ Yes ◉ No

IRB Name	Review Date	Determination
No records have been added		

4.2 * Is this a research study or a Compassionate Use/Emergency Use/HUD project?

◉ Yes ○ No

4.3 What type of research is this?

- ☑ Biomedical Research
- ☐ Clinical trial (FDA regulated)
- ☐ Behavioral Research
- ☐ Educational Research
- ☐ Psychosocial Research
- ☐ Oral History
- ☑ Other

Describe other:

Investigational research

4.4 Are you conducting this project in pursuit of a personal degree?

◉ Yes ○ No

4.6 * Is this human subjects research? (As defined by 32 CFR 219)

Human subject means a living individual about whom an investigator (whether professional or student) conducting research:
(i) Obtains information or biospecimens through intervention or interaction with the individual, and uses, studies, or analyzes the information or biospecimens; or

(ii) Obtains, uses, studies, analyzes or generates identifiable private information or identifiable biospecimens.

(•) Yes ( ) No

4.7 * Do you believe this human subjects research is exempt from IRB review?

( ) Yes (•) No

5.0 Personnel Details

5.1 List any Research Team members without EIRB access that are not previously entered in the protocol:

Name: (Last, First, M.I.)	Phone Number:	Email Address:	Associated Institution:
Miklovic, Tyler Role on Protocol: Assistant investigator	571-426-0876	tyler.miklovic@gmail.com	CRDAMC
Name: (Last, First, M.I.) Phillips, Eric Role on Protocol: Assistant investigator	Phone Number: 518-593-1715	Email Address: e_phlips@yahoo.com	Associated Institution: CRDAMC
Name: (Last, First, M.I.) Farley, Loyal S. Role on Protocol: Assistant investigator	Phone Number: 801-473-3347	Email Address: l.shane.farley@gmail.com	Associated Institution: CRDAMC
Name: (Last, First, M.I.) Walker, Jerimiah D. Role on Protocol: Assistant Investigator /Mentor	Phone Number: 210-380-2670	Email Address: jerimiah.d.walker.mil@mail.mil	Associated Institution: CRDAMC

5.2 Will you have a Research Monitor for this study?

( ) Yes
(•) No
( ) N/A

6.0 Data/Specimens

6.1 Does the study involve the use of existing data or specimens only (no interaction with human subjects)?

○ Yes ◉ No

7.0 Funding and Disclosures

7.1 Source of Funding:

Funding Source	Funding Type	Amount
No records have been added		

Total amount of funding:

7.2 Do you or any other Investigator(s) have a disclosure of a personal interest or financial nature significant with sponsor(s), product(s), instrument(s) and/or company(ies) involved in this study?

○ Yes ◉ No

If Yes, complete and attach Conflict of Interest forms for all key personnel

8.0 Study Locations

8.1 Is this a collaborative or multi-site study? (e.g., are there any other institutions involved?)

○ Yes ◉ No

8.2 Study Facilities and Locations:

Institution	Site Name	Site Role	FWA or DoD Assurance Number	Assurance Expiration Date	Is there an agreement?	IRB Reviewing for Site
No records have been added						

Other:

Other Institution Site	Site Role	FWA or DoD Assurance Number	FWA or DoD Expiration Date	Is there an agreement?	IRB Reviewing for Site
No records have been added					

8.3 Are there international sites?

Attach international approval documents, if applicable, when prompted. Note: Ensure local research context has been considered

○ Yes ◉ No

8.4 Is this an OCONUS (Outside Continental United States) study?

○ Yes ◉ No

Select the area of responsibility:

Have you obtained permission from that area of responsibility? (This is a requirement prior to study approval)

○ Yes ○ No

9.0 Study Details

9.1 Key Words:

Provide up to 5 key words that identify the broad topic(s) of your study

virtual reality, pain control, procedure related anxiety, distraction

9.2 Background and Significance:

Include a literature review that describes in detail the rationale for conducting the study. Include descriptions of any preliminary studies and findings that led to the development of the protocol. The background section should clearly support the choice of study variables and explain the basis for the research questions and/or study hypotheses. This section establishes the relevance of the study and explains the applicability of its findings

The use of distraction with media devices to assist in pain control has progressed in leaps and bounds in the last 15 years. Methods of distraction include, but are not limited to, video games, IPads, television, Augmented Reality, Virtual Reality (VR), cognitive behavioral therapy, and hypnosis. As reported by Mahrer and Gold, Virtual Reality has been studied with success in the treatment of burn patients undergoing physical therapy in multiple studies pitting VR against standard analgesia, video games, audio recordings, and cognitive behavioral therapy. Virtual Reality has also been successfully tested by Nilsson et al. in pediatric cancer patients receiving chemotherapy. They report a significant reduction in pain and distress during placement of subcutaneous venous port access. Furman et al. showed improved pain scores during dental procedures while watching movies. Additionally, there have been two studies on routine procedures by Gold et al. who investigated blood draws and intravenous placement of contrast for MRI scans in pediatric patients, both of which showed improved pain and anxiety scores. A recent randomized controlled trial by Özalp Gerçeker et al. showed reduced pain, fear and anxiety in pediatric patients undergoing blood draws when using VR devices, including a group which used the Ocean Rift application.

The technology relating specifically to Virtual Reality has seen significant changes in the last 5 years. Previously, Virtual Reality devices required either a direct connection to a local computer or even a dedicated system to run them. New to the market in the last few years are devices which do not require a connection to a computer, phone, or internet for some functions. This is significant as these devices can be used in any environment with minimal equipment.
Additionally, Malloy and Milling report that the use of more sophisticated technology with improved immersion is associated with even greater relief of pain. Although there are alternative methods for anxiety and pain control in the emergency setting, the use of immersive virtual reality (virtual reality methods in which the user is able to interact with the virtual environment) with these new standalone devices may improve pain control and anxiety associated with procedures, decreasing the need to use anxiolytics, opioids, and anesthetics in the emergency department. If a significant difference is found between the standard practice of performing venipuncture without pain control or virtual reality and the standard practice with the addition of virtual reality, then there would be strong implications to utilize the method in the emergency department setting. This could lead to future studies on additional procedures

with VR such as laceration repair, nail trephination, digital blocks, nail removal, lumbar punctures, and incision and drainage of abscesses.
In order to support the hypothesis of this study, which is that there will be a clinically significant decrease in pain perception when patients use virtual reality devices during venipuncture, a literature review was conducted focusing on articles published from 2000 to present using key terms *virtual reality, pain control, distraction,* and *procedure related anxiety*. The review was conducted on databases such as Pubmed, Ovid, Cochrane, Medline, Google Scholar, and a hand search through references used in applicable articles. A total of 60 articles were reviewed for relevance. Of the 60 reviewed articles, 23 were selected for their relevance to the research question. The literature review shows no studies of note have been conducted which would be applicable to an adult population for similar procedures (ie. venipuncture).

Given the lack of research on the use of VR with common procedures such as IV access in an adult population, it remains unclear whether the use of VR would be beneficial in this population, or if the benefits are limited only to pediatric patients. If the results of this study show significant improved pain and anxiety levels in adults, thus rejecting the null hypothesis (which is that there will be no significant difference in pain or anxiety with and without the use of virtual reality), it would be reasonable to initiate further research into the use of VR for other common procedures performed in the emergency department, laboratory, family practice, or in the military setting while deployed.

9.3 Objectives/Specific Aims/Research Questions:

Describe the purpose and objective(s) of the study, specific aims, and/or research questions/hypotheses

The study's primary outcome is to determine if the use of immersive virtual reality with the Oculus Go improves the patient's pain ratings and pain intensity levels when undergoing venipuncture during routine blood draws versus the standard practice. We will use the Visual Analogue Scale (VAS) for pain assessment after each blood draw.
The study's secondary outcome is to assess procedure related anxiety before and after each intervention, which will also be measured with the VAS. We will also use the Likert scale to measure participant satisfaction with the procedure and whether or not they would request the use of VR again if available.

9.4 Study Design:

Describe study design in one to two sentences (e.g., prospective, use of existing records/data /specimens, observational, cross-sectional, interventional, randomized, placebo-controlled, cohort, etc.). Specify the phase – Phase I, II, III, or IV – for FDA-regulated investigational drug research

This study is a prospective randomized controlled trial comparing the standard practice for venipuncture to the standard practice with the addition of Virtual Reality. In order to test our hypothesis, we will be conducting this study in the phlebotomy lab on patients aged 18-50 years old who are already undergoing venipuncture for routine lab testing.
The study will test the participant's acute pain level associated with the procedure, as well as testing their level of procedure-related anxiety before and after the procedure.

9.5 Target Population:

Describe the population to whom the study findings will be generalized

Adults over the age of 18 who are undergoing venipuncture for routine purposes. We expect the results to be generalizable to the full Military population as well as Civilians of the same age with similar concerns about pain or anxiety related to the procedure.

9.6 Benefit to the DoD:

State how this study will impact or be of benefit to the Department of Defense

The use of distraction with media devices to assist in pain control could have significant benefit to the DoD, particularly in the acute pain setting, to include the emergency setting, and Soldiers in the deployed setting. In the emergency setting, the use of VR could significantly improve patients' overall

experience and satisfaction with their visit, as well as reducing their pain and anxiety associated with having minor procedures performed. As noted by Fields el al. having an IV started is the most painful procedure performed during many patients emergency department visit. Given an improved patient experience, the use of VR could improve overall patient satisfaction scores on post visit surveys as well. Separately, but of equal importance, the use of standalone, immersive virtual reality could significantly benefit Soldiers in the Deployed setting. In the deployed setting, supplies for patient care can be variably available, to include adequate amounts of medications such as anxiolytics, opioids, and anesthetics. This is also applicable to large-scale training events such as NTC or JRTC where supplies for pain control may be even scarcer. A single VR unit does not expire, is reusable, and can be purchased for less than $200. If the results of this study show improved pain scores, it would be reasonable in a deployed/training environment setting to use the device as an adjunct to pain control and patient care in order to improve Soldiers treatment.

10.0 Study Procedures, Data Management, and Privacy

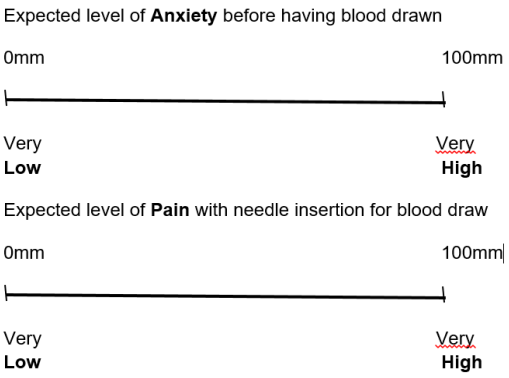
10.1 Study Procedures:

Describe step-by-step how the study will be conducted from beginning to end

A prospective randomized controlled trial comparing standard practice for conducting venipuncture to standard practice with the addition of Virtual Reality using the Oculus Go Head Mounted Display (HMD). The study will be performed on volunteers who are reporting to the phlebotomy lab to have venipuncture for blood draws that were previously ordered by their health care providers. Participants who were not already scheduled to undergo routine venipuncture will not be included.

When approaching the ticket stand to draw a waiting number for the lab, prospective participants will be asked by an assistant investigator located near the kiosk if they are interested in participating in the study. If the participants express interest, they will be directed to the screening station. The screening station will be set up in a private room near the lab waiting area, and participants will be screened for eligibility and educated on the benefits and risks of the study. They will also provide informed consent if they decide to participate.

All participants will be asked to fill out a self-reported data questionnaire in addition to the informed consent document to assess for inclusion and exclusion criteria discussed later in this protocol. This questionnaire will assess the participant's expected level of anxiety prior to the procedure and expected level of pain associated with the procedure by utilizing a visual analog scale (VAS). The VAS will be on a 100 millimeter line similar to the one shown below:



Once approved for participation in the study all participants will undergo a brief instructional class on how to operate the HMD and will be allowed sufficient time to become comfortable with its use. We expect approximately 5-10 minutes to be required for this portion of the study. Once familiar with the use of the VR headset, participants will be asked to randomly draw an envelope from a container. This envelope will contain a block and sequence number. The block and sequence number will be the subject ID and will correspond to a predetermined number set on a separate document that will determine if the participant will use the HMD during venipuncture or not. The screener will not have immediate access to the list showing which group the participant will be assigned to. One member of the study team will be present in the lab room to ensure the participant uses the VR headset (or not) according to what is randomly drawn. This member of the research team will have the list showing whether or not the participant is assigned to the control arm or the experimental arm. The participants will then proceed to the specimen room to undergo venipuncture.

Venipuncture for both groups will be occur in the non-dominant arm. The reasoning for this is that the Oculus Go requires one free hand to use a controller. This will ensure that the individuals participating are able to effectively use the device. Those unable to undergo venipuncture in the non-

dominant arm will undergo venipuncture in the dominant arm instead and will use the Oculus Go controller with their non-dominant hand.

Those utilizing the Oculus Go HMD will be interacting with the VR game Ocean Rift. They will utilize a single controller to explore an underwater safari park. Ocean Rift has multiple environments to choose from, including coral reefs, ship wrecks, lagoons, the arctic, and prehistoric seas. Participants may interact with and and learn about different creatures to include dolphins, turtles, orcas, ray, whales, sea lions, manatees, and dinosaurs. During the game users may travel where they please and interact with what they choose. The VR device is equipped with head-tracking software that allows the user to choose direction by looking around. The entire interior and exterior of the headset will be cleaned with alcohol-based wipes after each use. Alcohol will be used since it is generally well-tolerated on human skin, and since it evaporates quickly. The headset will be dried in the open air for a minimum of two minutes between each subject's use.

Those not using the VR will still wear a headset that will simply be turned off. This is to ensure that any significant change noted with the VR is due to the use of VR itself, and not simply due to "blindfolding" the patient during the procedure.

As some patients experiencing anxiety may be tempted to move during the procedure, lab personnel will isntruct participants to remain still during venipuncture. Participants will be advised that they may take breaks as needed if anxiety becomes overwhelming.

After undergoing the procedure, each participant will be asked to fill out the post-procedure questionnaire and return it to the study team member present in the lab room, who will clean the headset as the participant completes the questionnaire. This questionnaire assesses the patient’s pain intensity and level of anxiety with the VAS similar to the VAS shown above, as well as the patient’s satisfaction with the visit which will be measured utilizing a Likert scale for individual questions (see below).

Overall, how satisfied were you with the use of Virtual Reality in reducing your pain level?

5	4	3	2	1
Very Satisfied	Satisfied	Not Sure	Unsatisfied	Very Unsatisfied

Overall, how satisfied were you with the use of Virtual Reality in reducing your anxiety level?

5	4	3	2	1
Very Satisfied	Satisfied	Not Sure	Unsatisfied	Very Unsatisfied

How likely would you be to request Virtual Reality if it were available for use for other painful or anxiety-inducing procedures?

5	4	3	2	1
Very Likely	Likely	Not Sure	Unlikely	Very Unlikely

10.2 Data Collection:

Describe all the data variables, information to be collected, the source of the data, and how the data will be operationally measured.

The independent variable for this study is the use of VR or lack thereof. The dependent variables include accurately measuring anxiety levels pre and post procedure, pain levels after the procedure, and satisfaction with the procedure in regards to pain control, anxiety management, and ease of use.
The participant’s gender, age, and a minimal medical history will be obtained for purposes of inclusion or exclusion from the study. The information collected relevant to the conduct of the study will include any history of bloodborne disease, anxiety, seizures, pregnancy status, right vs left handedness, VR experience, nausea, vomiting, or vertigo. Participants will also be asked to rate their expected pain and anxiety associated with venipuncture using the Visual Analog Scale (VAS). The above information will be collected on the self-reported data sheet prior to providing specimens. The questionnaires will also enquire as to whether the participant took any pain medications prior to arrival, as well as rate pre and post-procedure anxiety level on a VAS scale. Finally, patients will then rate their procedure related pain intensity on the VAS scale.
Participants will also be asked about their satisfaction level with the use of VR in regards to pain control, anxiety management, and ease of use and their likelihood of requesting VR if available in the future using the Likert scale. All information will be provided and data collected voluntarily, and participants may choose not to answer any questions they choose.
The VAS will be measured using a 100 millimeter line on which the participant will be instructed to place a mark corresponding to their pain or anxiety, i.e. 5 would be very little anxiety and 95 would be very high anxiety. The data will then be acquired using a metric ruler and the corresponding number will be documented. The Likert scale will be measured using a one to five numeric scale on which the patient will be asked to rate their satisfaction with the use of the VR headset in regards to pain control, anxiety management, and ease of use, and their likelihood of requesting its use again, 1 being very unlikely, 2 likely, 3 unsure, 4 likely and 5 very likely.

10.3 At any point in the study, will you request, use, or access health information in any form, including verbal, hard copy and electronic?

○ Yes ◉ No

11.0 Statistical/Data Analysis Plan

11.1 Statistical Considerations:

List the statistical methods to be used to address the primary and secondary objectives, specific aims, and/or research hypotheses. Explain how missing data and outliers will be handled in the analysis. The analysis plan should be consistent with the study objectives. Include any sub-group analyses (e.g., gender or age group). Specify statistical methods and variables for each analysis. Describe how confounding variables will be controlled in the data analysis

The Primary outcome for this study is the measure of perceived pain intensity with and without the use of the VR headset. The outcome will be measured with the VAS scale for pain which will be completed immediately after each procedure. The VAS will be measured as a 100 mm line on which the participant will be instructed to make a mark corresponding to their level of pain. The mark will then be measured with a metric ruler and the appropriate number documented.

A 13 mm change is the minimum clinically significant difference that is noticeable by patients according to a study by Gallagher et al 2001. **The null hypothesis in this study is that the average pain intensity between groups will be not be clinically significant, which is defined as 13mm.**

The primary statistical method will be to measure the mean perceived pain between groups using the VAS. The t-test will be used to determine if the effect size between the two groups is statistically significant as this is a study with a dichotomous predictor variable (with or without VR) but a continuous outcome variable (pain measurement on the VAS).

Additional outcomes to include satisfaction with the procedure and likelihood of requesting VR again if it is available will be measured using the Likert scale. It will be measured on a one to five scale. Results of the Likert scales will be reported as is. Likert scale questions are as follows:

Overall, how satisfied were you with the use of Virtual Reality in reducing your pain level?

5	4	3	2	1
Very Satisfied	Satisfied	Not Sure	Unsatisfied	Very Unsatisfied

Overall, how satisfied were you with the use of Virtual Reality in reducing your anxiety level?

5	4	3	2	1
Very Satisfied	Satisfied	Not Sure	Unsatisfied	Very Unsatisfied

How likely would you be to request Virtual Reality if it were available for use for other painful or anxiety-inducing procedures?

5	4	3	2	1
Very Likely	Likely	Not Sure	Unlikely	Very Unlikely

As this study will utilize and Intention to Treat (ITT) methodology, all enrolled subjects will be included in the final data analysis.

11.2 Sample Size:

60

11.3 Total number of subjects requested (including records and specimens):

60

11.4

If you are recruiting by study arm, please identify the arms of the study and how many subjects will be enrolled in each arm

Control (standard of care) - 30

Experimental (standard of care plus virtual reality) - 30

11.5 Please provide a justification for your sample size

A study performed by Todd et al 1995 and a later validation study by Gallagher et al 2001 both found that a minimum clinically significant change in pain as measured on the VAS is 13mm. Both studies found that the change in pain reported as "a little more pain" or "a little less pain" after intervention averaged to 13mm. Both studies also found that the standard deviation of change in pain reported on the VAS as "a little more pain" or "a little less pain" was 17mm.

Since the t-test will be used at the end of the study to determine if the effects are statistically significant, the E/S ratio (expected effect size divided by the standard deviation of the outcome variable) was used to determine the sample size. The E/S ratio is being estimated based on the studies cited above. The expected effect size (13mm) divided by the standard deviation (17mm) =0.76. To ensure a 2-sided α 0.05 and β 0.20, a minimum of 27 subjects are required for each arm. This is based on a sample size calculator created by Dhand et al as well as appendix 6A of *Designing Clinical Research* authored by Hulley et al.

Although a total of only 54 participants is required for this study to be effectively powered, we're requesting 60 to account for a potential dropout rate of 10%.

Minitab software will be utilized for final data analysis.

11.6 Data Analysis Plan: Complete description: Background, Objectives, Design, Step by Step how the project is going to be done, Data analysis plan:

The primary outcome be measured as the average pain rating between the two groups as measured on the VAS. The t-test will be used to compare the two groups to determine if the difference is statistically significant. The difference between the two groups should be at least 13mm to be considered clinically significant.

The preprocedural anxiety will also be measued using the VAS and the average difference will be reported in the data, although a minimum clinically significant score is not available.

Since participants will be randomly assigned to each study arm, it will be impossible to insure an even spread of ages between the two study arms. It may be possible that pain perception changes with age, and since this study will include ages 18-50, data tables comparing the average changes between those in different age groups (i.e. 18-25, 26-33, 34-41, 42-50). A separate subgroup analysis will be performed comparing different age subgroups.

Similar data analysis will be included for pre-procedural anxiety.

Likert scale questions ("Overall, how satisfied were you with the use of Virtual Reality?" and "How likely would you be to request Virtual Reality if it were available for use?") will be reported in the final manuscript.

12.0 Participant Information

12.1 Subject Population:

Adults aged 18-50 who meet inclusion criteria and are already scheduled to undergo venipuncture. Most will be active duty Soldiers, Family members, DA civilians, and retirees. No compensation will be provided for participating.

12.2 Age Range:

Check all the boxes that apply. if the age range of potential subjects (specimens, records) does not match the range(s) selected, please specify in the text box.

- [ ] 0-17
- [x] 18-24
- [x] 25-34
- [x] 35-44
- [x] 45-54
- [ ] 55-64
- [ ] 65-74
- [ ] 75+

18-50

12.3 Gender:

- [x] Male
- [x] Female
- [ ] Other

12.4 Special categories, check all that apply

- [ ] Minors /Children
- [ ] Students
- [ ] Employees - Civilian
- [ ] Employees - Contractor
- [ ] Resident/trainee
- [ ] Cadets /Midshipmen
- [ ] Active Duty Military Personnel
- [ ] Wounded Warriors
- [ ] Economically Disadvantaged Persons
- [ ] Educationally Disadvantaged Persons
- [ ] Physically Challenged (Physical challenges include visual and/or auditory impairment)
- [ ] Persons with Impaired Decisional Capacity
- [ ] Prisoners
- [ ] Pregnant Women, Fetuses, and Neonates
- [ ] Non-English Speakers
- [ ] International Research involving Foreign Nationals - Headquarters Review is necessary

12.5 Inclusion Criteria:

Order Number	Criteria
1	Adults aged 18-50
2	Currently scheduled to undergo venipuncture

12.6 Exclusion Criteria:

Order Number	Criteria
	Less than 18 years old or greater than 50 years old

1	
2	History of motion sickness (nausea or vertigo)
3	Pregnant women
4	Reported history of blood borne disease (no request will be made for which disease participant has)
5	Use of pain medication(s) on day of study
6	Current use of medical devices, including hearing aids, pacemakers, implanted cardiac defibrillators
7	Currently experiencing headache/migraine

13.0 Recruitment and Consent

13.1 Please describe the recruitment process, including how subjects will be identified and selected for the study.

When approaching the ticket stand to draw a waiting number for the lab, prospective participants will be asked by an assistant investigator located near the kiosk if they are interested in participating in the study. Participants will be selected in consecutive order (as long as the screening room is open) to avoid selection bias. However, patients who are obviously outside of the age range of 18-50 will not be asked to participate, although this process may leave room for some selction bias. If participants express desire, they will move to a screening station located in a private room near the lab to be educated on the details of the study, to include any risks. If they consent, they willl fill out a screening questionnaire. If patients are eligible, they'll be given a brief tutorial on use of the VR headset and randomly assigned an envelope containing a card stating that they willl use VR during venipuncture or undergo standard practice (the researcher will be blind to which group the participant is assigned to). Once instruction is complete, they'll return to the lab waiting area to draw a ticket to provide a specimen IAW standard lab practice.

13.2 Compensation for Participation:

There will not be any compensation (payment or otherwise) for participating in this study.

13.3 Please describe the pre-screening process. If no pre-screening, enter Not Applicable in the text editor

When patients approach the ticket kiosk, a member of the study team will ask them if they're interested in participating in a study related to pain control with venipuncture. To avoid perceived coercion, the recruiter will be in scrubs so that his rank will not be visible. If the participants wish to participate, they'll be directed to a screening station in a private room.

At the screening station, candidates will be screened to insure they meet inclusion/exclusion criteria by completing a prescreening form that addresses all participation criteria. After that, they'll be provided informed consent documents and will undergo a brief tutorial for use of the VR headset prior to returning to the lab waiting area to draw a ticket.

13.4 Consent Process:

Revised Common Rule, Section 219.116: General requirements for informed consent, whether written or oral, are set forth in this paragraph and apply to consent obtained in accordance with the requirements set forth in paragraphs (b) through (d) of this section. Broad consent may be obtained in lieu of informed consent obtained in accordance with paragraphs (b) and (c) of this

section only with respect to the storage, maintenance, and secondary research uses of identifiable private information and identifiable biospecimens.

Are you requesting a waiver or alteration of informed consent?

○ Yes ◉ No

Please explain the consent process:

The consent process will take place at the time of recruitment, and will occur in a private room with only the subject and investigator present. Participants will be walked through the informed consent document section by section, being allowed time to read each section and decide if they would like to continue. Participants will be informed prior to starting that participation is voluntary and that they may choose not to participate at any time during the consent process, throughout the duration of the study, and after it is complete. They will be informed on the process to withdraw from the study which will be to contact CPT Perdue at the above listed email or phone number which will be on the consent form and pointed out to the participant. Once complete the participant will be asked to sign the consent document and the PI will sign the consent form. Copies of the signed consent form will be made and provided to the participant. Participants will also be asked to fill out the Self-reported participant data form for inclusion /exclusion from the study and will be informed prior to leaving whether they are eligible to participate. All questions will be answered by the PI or AI at any point during participant contact or via email or phone.

13.5 DoDI 3216.02 requires an ombudsman to be present during recruitment briefings when research involves greater than minimal risk and recruitment of Service members occurs in a group setting. If applicable, you may nominate an individual to serve as the ombudsman.

◉ N/A
○ Propose ombudsman

13.6 Withdrawal from Study Participation:

Explain the process for withdrawal and specify whether or not the subjects will be given the opportunity to withdraw their data their data/specimens in the event they wish to withdraw from the study

The decision to participate in this study is completely voluntary. No one will be coerced or intimidated into participating in this project. The principal investigator or his associate investigator will adequately answer any and all questions about this study, participation, and the procedures involved. If significant new findings develop during the course of this study that may relate to participant participation, they will be informed.

Subjects may withdraw this consent at any time and discontinue further participation in this study without affecting eligibility for care or any other benefits to which they are entitled. Should participants choose to withdraw, they must simply inform CPT Perdue that they have no desire to continue during their visit at the lab. As no PHI will be collected and subjects will be unidentifiable after completing questionnaires, participants will be unable to withdraw after completing all questionnaires.

14.0 Risks and Benefits

14.1 Risks of Harm:

Identify all research-related risks of harm to which the subject will be exposed for each research procedure or intervention as a result of participation in this study. Consider the risks of breach of confidentiality, psychological, legal, social, and economic risks as well as physical risks. Do not describe risks from standard care procedures; only describe risks from procedures done for research purposes

Risk associated with this study may include dizziness, loss of awareness, eye strain, temporary visual abnormalities (including blurred or double-vision), muscle-twitching, impairment of hand-eye coordination, impaired balance, excessive sweating, drowsiness, fatigue, headache, lightheadedness, disorientation, nausea and/or vomiting from the use of the VR device, although the frequency of these events is rare not well-defined. Approximately 1 in 4,000 users may experience seizures despite having no history of seizure disorders; seizures are more common in children (who are excluded from this study). Risk of experiencing adverse events may be increased if patients have a history of seizure disorders, or if they have other underlying neurological disorders. Risk may also be increased if with the use of certain medications, although this data has not been studied.

There is also risk associated with accidental movement of arm during venipuncture, which could result in mistakenly puncturing unintended an area of the patients skin. However, this is unlikely as standard practice when drawing blood is for the phlebotomist to steady the patient's arm
and draw skin taught with the hand not holding the needle, minimizing the likelihood that the patient will move.

There is also a risk in loss of subject confidentiality, which is addressed in section 14.2.

14.2
Measures to Minimize Risks of Harm (Precautions, safeguards):

For each research procedure or intervention, describe all measures to minimize and/or eliminate risk of harms to subjects and study personnel

Risks associated with the use of VR will be mitigated by screening for and excluding patients with a recent history of vertigo or dizziness, motion sickness, current symptoms of nausea and/or vomiting, and pregnancy. Additionally, in an effort to minimize risk, the following instructions will be provided during the tutorial:

- If you begin to experience nausea, headache, eye strain, or any other discomfort, please remove the headset and inform a member of the research team immediately

Participants will also be advised to request breaks as needed if they experience uncontrollable anxiety, or they may withdraw if they request as stated in the consent form.

To minimize the risk of patients moving arms during venipuncture, phlebotomists will be asked to alert the patient that they are about to penetrate the skin and to hold still.

To minimize the risk of loss of confidentiality, all information collected will be controlled with strict record keeping procedures. All de-identified data collected will be stored in a locked drawer behind a locked door when not in use and only accessible to the research team members. Once gathered, the data will be transferred into electronic form on a secure CAC-enabled/password protected government computer that will be in the possession of the PI, when not in the PI's possession it will be stored in a locked room. The electronic documents will be kept for 3 years and then deleted. There will be no legal or economic risks associated with this study. No adverse action will be taken against anyone who withdrawals from the study at any time.

14.3
Confidentiality Protections (for research records, data and/or specimens):

Describe in detail the plan to maintain confidentiality of the research data, specimens, and records throughout the study and at its conclusion (e.g., destruction, long term storage, or banking). Explain the plan for securing the data (e.g., use of passwords, encryption, secure servers, firewalls, and other appropriate methods). If data will be shared electronically with other team members/collaborators outside the institution, describe the method of transmission and safeguards to maintain confidentiality. Explain whether this study may collect information that State or Federal law requires to be reported to other officials or ethically requires action, e.g., child or spouse abuse

All de-identified data collected will be stored in a locked drawer behind a locked door when not in use and only accessible to the research team members. Once gathered, the data will be transferred into electronic form on a secure CAC-enabled/password protected government computer that will be in the

possession of the PI. When not in the PI's possession it will be secured in a locked office. The de-identified electronic data will be stored on the attached Excel spreadsheet. Paper copies will be shredded once data has been transferred. Once the study is complete the electronic documents will be maintained on the primary investigator's CAC-enabled/password protected government computer until the computer is turned in upon PCSing and then deleted.

14.4 Potential Benefits:

Describe any real and potential benefits of the research to the subject and any potential benefits to a specific community or society

If the individuals in the research are considered experimental subjects (per 10 USC 980), and they cannot provide their own consent, the protocol must describe the intent to directly benefit all subjects

The subjects in the experimental group will potentially benefit from this study via reduction in anxiety and pain control, but will not directly benefit from this study in any other way. If Virtual Reality is shown to decrease pain intensity and anxiety levels with venipuncture, it may be offered in the lab setting, clinic setting, emergency room setting, or deployed setting to improve the care that can be provided.

14.5 Privacy for Subjects:

Describe the measures to protect subject's privacy during recruitment, the consent process, and all research activities, etc.

During the screening process no PHI will be collected. The participant's name and signature will be on the consent form, but will not be linked to any PHI. The screening questionnaire will contain age and gender, and will ask several questions about health, but will not be linked to the consent form and therefore will not contain PHI. This will be performed in a private room with only the member of the study team collecting the data present. Once gathered, the data will be stored in electronic form on a secure CAC-enabled/password protected government computer that will be in the possession of the PI. After paper documents are transferred electronically they will be shredded, the electronic documents will be kept for 3 years and then deleted.

14.6 Incidental or Unexpected Findings:

Describe the plan to address incidental findings and unexpected findings about individuals from screening to the end of the subject's participation in the research. In cases where the subject could possibly benefit medically or otherwise from the information, state whether or not the results of screening, research participation, research tests, etc., will be shared with subjects or their primary care provider. State whether the researcher is obligated or mandated to report results to appropriate military or civilian authorities and explain the potential impact on the subject

Incidental findings are unlikley given the procedures in this study. However, should one arise and the subject could possibly benefit from the information, they will be informed.

15.0 Study Monitoring

15.1 Your study requires either Data and Safety Monitoring Plan (DSMP) or a Data and Safety Monitoring Board (DSMB).

- ○ DSMP
- ○ DSMB
- ○ Both
- ◉ Not Applicable

16.0 Reportable Events

16.1 Reportable Events: Consult with the research office at your institution to ensure requirements are met. Describe plans for reporting unexpected adverse events and unanticipated problems. Address how unexpected adverse events will be identified, who will report, how often adverse events and unanticipated problems will be reviewed to determine if any changes to the protocol or consent form are needed and the scale that will be used to grade the severity of the adverse event.

Consult with the research office at your institution to ensure requirements are met

• Describe plans for reporting expected adverse events. Identify what the expected adverse events will be for this study, describe the likelihood (frequency, severity, reversibility, short-term management and any long-term implications of each expected event)

• Describe plans for reporting unexpected adverse events and unanticipated problems. Address how unexpected adverse events will be identified, who will report, how often adverse events and unanticipated problems will be reviewed to determine if any changes to the research protocol or consent form are needed and the scale that will be used to grade the severity of the adverse event

Expected possible adverse events for this study are as follows:
Headache
Dizziness
Eye strain
Blurred vision
Muscle twitching
Eye strain
Disorientation
Excessive sweating
Loss of balance

The incidence of these events are not well-defined, so it's difficult to estimate the likelihood of these events occuring. However, participants will be instructed to discontinue the use of the headset if any of these symptoms, or any other discomfort occurs. If participants experience any of these symptoms and discontinue the use of the device, they will be monitored briefly by the research investigators as these symptoms should resolve spontaneously and should not have long-term implications. If symptoms do not resolve within 10-15 minutes, they will be escorted to the emergency room for further evaluation.

Expected adverse events will be reported by the principal investigator in the same fashion as unanticipated problems (stated below). As data collection is only expected to occur for 3-4 days, investigational staff will be reviewed after each adverse event to determine if changes need to be made to the research protocol or consent form.

The only known unanticipated problem involving risk to subject or others (UPIRSO) is seizure. As stated in the Oculus Go user manual, this has an incidence of approximately 1 in 4,000 users, although it most commonly occurs in children (who are excluded from the study). In the event that this occurs, subjects will have all sharp objects moved away from them, be placed laterally on their sides, and emergency personnel will be contacted for transport to the ER for further evaluation and treatment.

Unanticipated problems involving risk to subjects or others will be reported promptly providing initial notification of the event as quickly as possible after the research team's knowledge of the event, but within (5) business days of identification by phone (210-916-2598), by e-mail (usarmy.jbsa.medcom-bamc.mbx.bamc-irb@mail.mil), or by facsimile (210-916-1650) to the Office of the Regional Health Command Central (RHC-C) Institutional Review Board (IRB). A complete written report will follow the initial notification within ten (10) business days. The complete report will be sent to the RHC-C IRB Office I, Brooke Army Medical Center, ATTN: MCHE-ZQ, Department of Quality and Safety, 3551 Roger Brooke Drive, Fort Sam Houston, Texas 78234-6315.

To fulfill the local responsibility for monitoring and oversight of research, all potential UADEs that are unexpected and determined to be at least possibly related or definitely related to research participation

will be promptly reported within 24 hours of learning of the event by telephone or by email to the local IRB Office. A complete report will follow the initial notification within 5 business days.

17.0 Equipment/non-FDA Regulated Devices

17.1 Does the study involve the use of any unique non-medical devices/equipment?

(•) Yes ( ) No

Please describe:

An Oculus Go head mounted display (HMD) will be used to display the virtual environment. The HMD has a 3-point adjustable harness which is used to hold the display in place on the wearer's head. The HMD is not a medical device. Side effects using virtual reality systems include occasional reports of transient nausea, dizziness and headache.

There are no reports of long-term side effects associated with using virtual reality equipment.

The Oculus Go head mounted display does not meet the definition of a Significant Risk device, thus this study is considered a Non-significant Risk Device Study. We make this determination in accordance with the Significant Risk Device Study definition under 21 CFR 812.3(m) as part of the Investigational Device Exemptions (IDE) regulation (21 CFR 812).
Specifically, this device and its components:
1) are not implantable devices;
2) are not purported nor represented to be used to support or sustain human life;
3) are not used to diagnose, cure, mitigate, or treat a disease or otherwise prevent impairment of human health;
4) do not present a potential for serious risk to the health, safety, or welfare of a subject.
They will be labeled "experimental" for this study.

18.0 FDA-Regulated Products

18.1 Will any drugs, dietary supplements, biologics, or devices be utilized in this study?

- [ ] Drugs
- [ ] Dietary Supplements
- [ ] Biologics
- [x] Devices
- [ ] N/A

18.3 Device Details:

- [ ] Are device(s) in this research being used in accordance to the approved labeling?
- [x] Are device(s) in this research being used in a manner other than its approved labeling?

When adding a device indicate in the details section of the device if the use is either used in accordance to the approved labeling or in a manner other than it's approved labeling

View Details	Device Name
⊟	Oculus Go

Manufacturer/Supplier of Device	Oculus VR, LLC
Where will the Devices Be Stored	In office at Darnall ED
Will Devices be supplied at no Cost	Yes

Is this a HUD (HDE)	No
HDE Number	
Who holds the IDE	N/A
IDE details	IAW CFR 812.2(b) device meets abbreviated requirements. Device will be labeled with “CAUTION-Investigational device. Limited by Federal law to investigational use.”

⊟ Oculus Go

Manufacturer/Supplier of Device	Oculus VR, LLC
Where will the Devices Be Stored	Office at Darnall ED
Will Devices be supplied at no Cost	Yes
Is this a HUD (HDE)	No
HDE Number	
Who holds the IDE	N/A
IDE details	IAW CFR 812.2(b) device meets abbreviated requirements. Device will be labeled with “CAUTION-Investigational device. Limited by Federal law to investigational use.”

⊟ Oculus Go

Manufacturer/Supplier of Device	Oculus VR, LLC
Where will the Devices Be Stored	Office at Darnall ED
Will Devices be supplied at no Cost	Yes
Is this a HUD (HDE)	No
HDE Number	
Who holds the IDE	N/A
IDE details	IAW CFR 812.2(b) device meets abbreviated requirements. Device will be labeled with “CAUTION-Investigational device. Limited by Federal law to investigational use.”

⊟ Oculus Go

Manufacturer/Supplier of Device	Oculus VR, LLC
Where will the Devices Be Stored	Office at Darnall ED
Will Devices be supplied at no Cost	Yes
Is this a HUD (HDE)	No
HDE Number	
Who holds the IDE	N/A
IDE details	IAW CFR 812.2(b) device meets abbreviated requirements. Device will be labeled with “CAUTION-Investigational device. Limited by Federal law to investigational use.”

18.4 Reporting Requirements for FDA-regulated research under IND and IDE:

Describe the process for complying with FDA regulatory requirements for adverse event reporting and adverse device effects reporting to the sponsor

The Oculus Go is an investigational device that poses a non-significant risk to the participant and is not being marketed as a medical device. The device does not pose a significant risk as it is not intended to

be implanted, used to sustain/support life, used for diagnosis or treatment, or present any other potential for serious risk to health.

18.5 Sponsor (organization/institution/company):

☑ N/A

If applicable, provide sponsor contact information:

19.0 Research Registration Requirements

19.1 ClinicalTrials.gov Registration:

- ○ Registration is not required
- ◉ Registration pending
- ○ Registration complete

19.2 Defense Technical Information Center Registration (Optional):

- ◉ Registration is not required
- ○ Registration pending
- ○ Registration complete

20.0 References and Glossary

20.1 References:

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20.2 Abbreviations and Acronyms:

VR - Virtual Reality
HMD - Head Mounted Display
IV - Intravenous
CRDAMC - Carl R. Darnall Army Medical Center
ED - Emergency Department
VAS - Visual Analogue Scale
I&D - Incision and Drainage