Veterans Affairs (VA) Immersive Technology: Defining a New Reality in Health Care

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Dr. Anne Lord Bailey is the U.S. Department of Veterans Affairs (VA) Immersive Lead for Veteran's Health Administration's (VHA) Office of Healthcare Innovation and Learning (OHIL). Dr. Bailey started her health care career as a pharmacy resident and then pharmacy practitioner for Western North Carolina VA Healthcare System in Asheville, NC. In 2021, Dr. Bailey became OHIL's lead for immersive technology, establishing VA Immersive as a collaborative program across OHIL. She has worked with thought leaders in government, academia, and industry, while co-leading the expansion of the VHA Extended Reality (XR) Network alongside Caitlin Rawlins. Recently, Dr. Bailey was awarded 2022 G2Xchange Change Agent Award, 2022 Service to the Citizen Award, and International Virtual Reality in Healthcare Association's 2022 Hero Award.

Disclosures

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Medically Ready Force… Ready Medical Force

Learning Objectives

At the conclusion of this activity, participants will be able to:

1. Summarize the current state of Immersive Technology for clinical conditions at VA, as well as staff training and education.

2. Identify the rationale for incorporating Immersive Technology into VA clinical practice.

3. Explain the current and future roles that providers could play in leveraging and implementation Immersive Technology.

4. Describe the future potential and yet unanswered questions about Immersive Technology in health care.
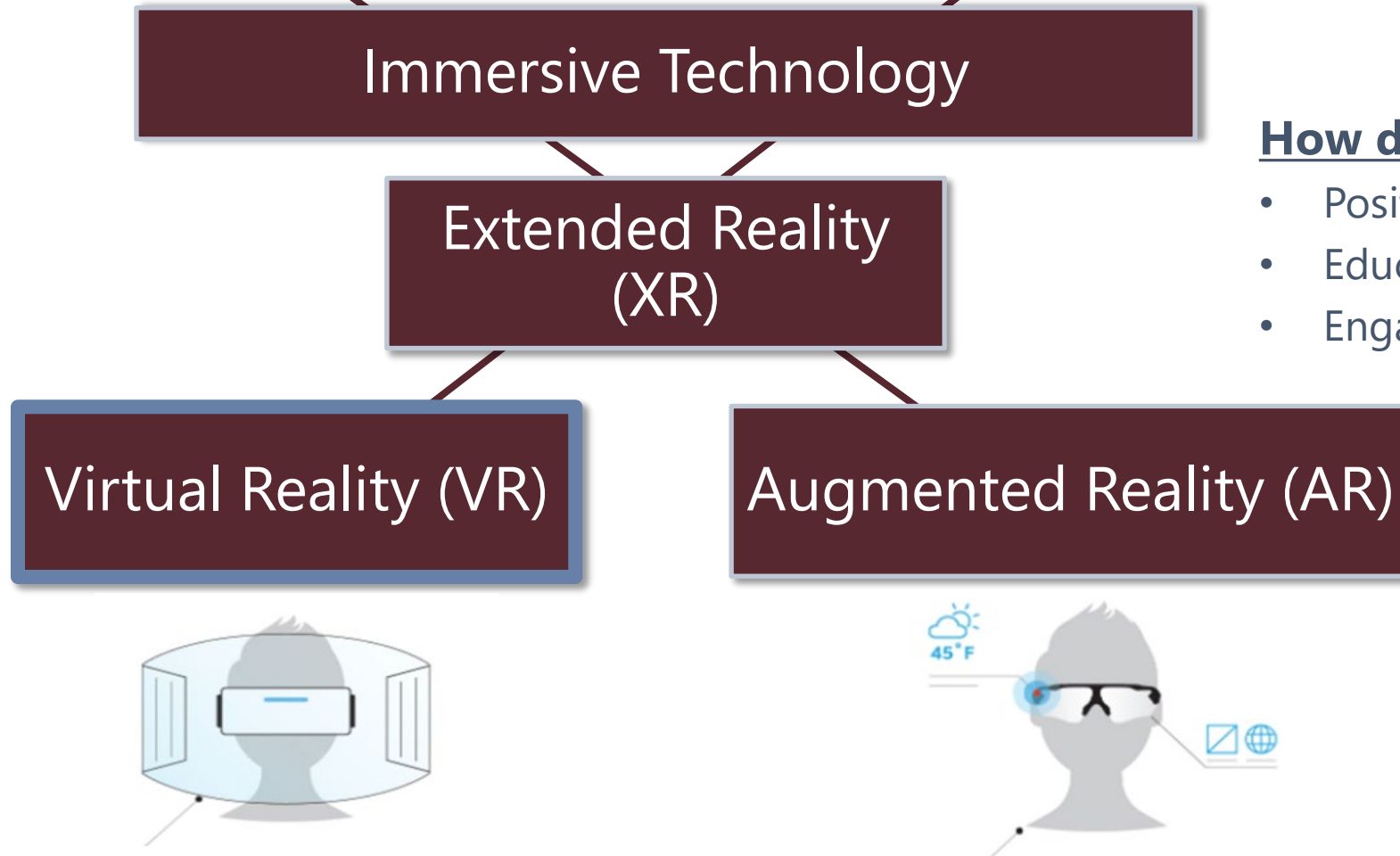
Examples

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Relevant Terms

Immersive Technology

Extended Reality (XR)

Virtual Reality (VR)

Augmented Reality (AR)

How does it work?

- Positive distraction
- Education, learned behavior
- Engagement and adherence

Polling Question 1

- Have you previously used Virtual or Augmented Reality?
  - Yes – both
  - Yes – Virtual Reality
  - Yes – Augmented Reality
  - I'm not sure
  - No

Relevant Terms

Degree of Immersion:

- The perception created by surrounding the user with stimuli that provide an engrossing virtual environment. For example, VR is more immersive than AR as the individual is surrounded by the virtual environment.

Presence:

- Describes the user's perception of being physically present in the virtual environment.
- Presence tends to increase with higher levels of immersion.

Head-Mounted Display (HMD):

- Display devices that are adjusted directly in front of one or both eyes using a head mount.
- With VR HMDs, the head display completely shields the user from the real environment.

Relevant Terms

Gaze Control:

- The ability of the user to interact with the VR content, where the content is directly impacted by the user's gaze (i.e., the direction the user is looking and the duration) allow interaction and selection when wearing a VR headset.

Eye-Tracking:

- Used to measure and keep track of the direction of the user's gaze.
- Using this information, it is possible to reproduce the eyes' natural process of bringing objects into/out of focus depending on the user's area of focus, as well as track engagement with content and potentially track biomarkers.

Screen-Casting:

- Methods of allowing people other than the current user of the headset to see what the user is seeing.

Relevant Terms

Kiosk (or Single-App) Mode:

- When the headset is restricted to run one specific app, platform, or program.

Degrees of Freedom (DoF):

- The number of ways a rigid object can move through a 3D-space.
- Overall, an essential concept in VR that allows human movement to be converted into movement within the VR environment. More degrees of freedom = more movements tracked (i.e., 3 DoF vs. 6 DoF).

Field of View:

- Field of view represents the area that can be seen when looking at a single point.
- For example, VR headsets with a wide field of view (110 degrees or more) produce a greater sense of immersion because you can see the edges of the virtual world less.

Spatial Computing:

- The digitization of activities of machines, people, objects, and the environments in which they take place to enable and optimize actions and seamless interactions.

Current and Future State of VR in Health Care

Virtual Reality Adoption in Health Care

Virtual Reality solutions allow both healthcare professionals and patients to interact with simulated environments tailored for medical education, pain management, or rehabilitation.

According to Goldman Sachs Global Investment Research, healthcare is among the top three industries that will remain leading adopters of VR technology up to 2025. 82% of healthcare professionals agree that **virtual reality creates a convenient way of accessing and learning information for medical students and practicing healthcare professionals.** 62% of patients would welcome virtual reality healthcare services as an alternative to traditional healthcare (ScienceSoft, 2020).

Current and Future State of VR in Health Care

Effect of Immersive Virtual Reality on Pain and Anxiety at a Veterans Affairs Health Care Facility

Caitlin R. Rawlins[1]*, Zachary Veigulis[2], Catherine Hebert[1], Catherine Curtin[2,3] and Thomas F. Osborne[2,4]

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Objectives: The primary objective of this evaluation is to determine the impact of virtual reality (VR) distraction on acute and chronic pain in Veterans within the Veterans Affairs Health Care System (VA). A secondary objective is to determine the impact of VR on the experience of stress and anxiety in Veterans utilizing VR for the indication of pain. A third objective is to develop an understanding of the Veteran experience of using VR in a healthcare setting.
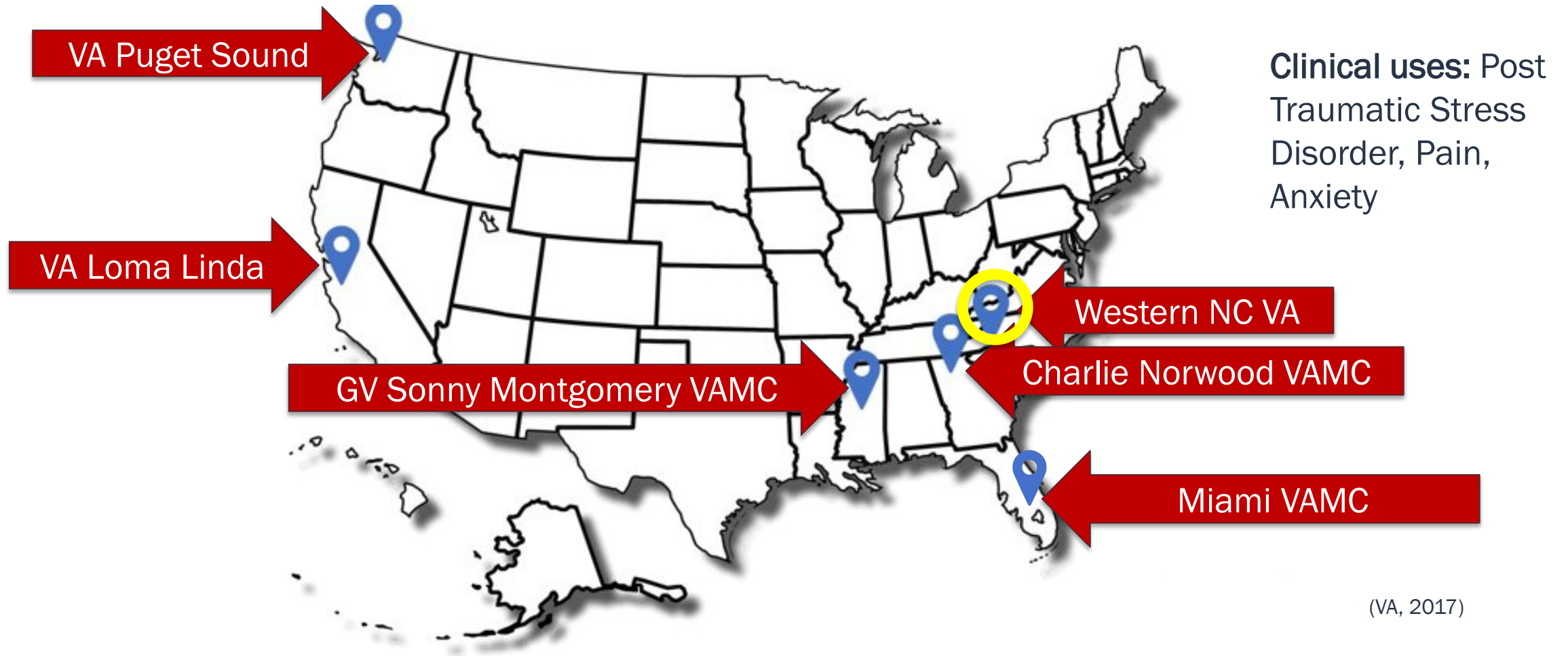
"VR awakened Veterans to the possibility of expanding their use of non-pharmacologic therapies" (Rawlins et al, 2021)

Clinical Implementation Early Adoption, 2017

VA Puget Sound

VA Loma Linda

GV Sonny Montgomery VAMC

Western NC VA

Charlie Norwood VAMC

Miami VAMC

Clinical uses: Post Traumatic Stress Disorder, Pain, Anxiety

(VA, 2017)

Medically Ready Force… Ready Medical Force

Butch Phillips Video

https://youtu.be/z_qgMfEkSH8

Immersive Technology Use: 40 Indications, 2023
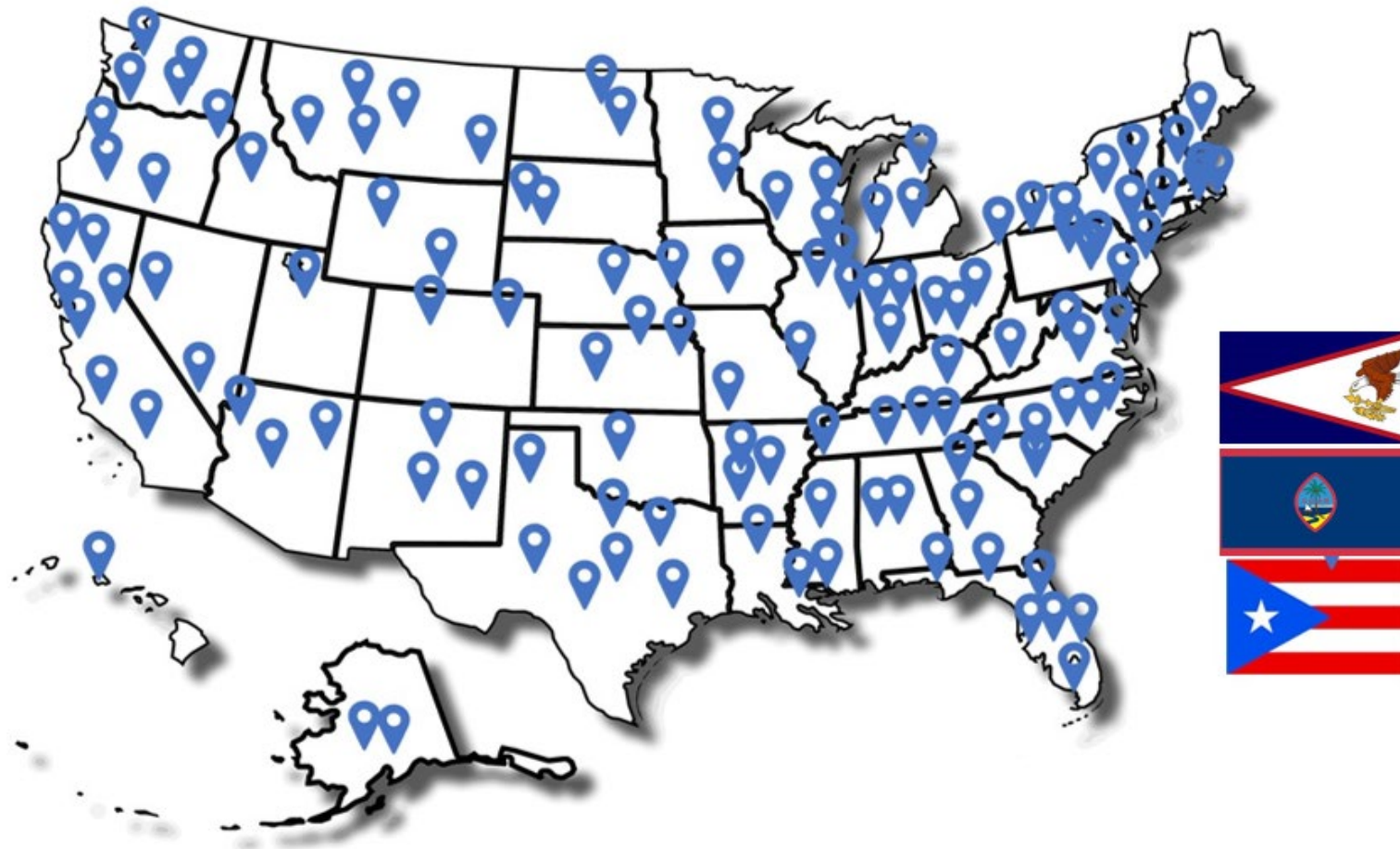
Polling Question 2

- Are you aware of any use of virtual reality for clinical care in your health care system?

  - ○ Yes

  - ○ No

  - ○ I'm not sure

Active Use Cases

- Suicide prevention
- Spinal cord injury/disease
- Anxiety
- Depression
- Social isolation
- Substance use disorder
- Addiction recovery
- Post-traumatic stress
- Phantom limb pain

- Pain management (acute, chronic, acute on chronic)
- Physical, occupational, recreation therapy
- Procedural use
- Low vision rehabilitation
- Falls risk assessment
- Neurological assessment
- Palliative care
- Creative Arts therapy
- Facilities management

- New employee orientation
- Empathy training
- Employee wellness
- Employee education
- Firearms safety
- Pre-surgical planning
- Stress Reduction, Relaxation, and Positive Distraction
- Women's Health

Staff Engagements

- Over 2000 frontline staff and leaders

- More than 165 VA facilities

- Four Communities of Practice

- Office Hours

- XR 101

Photos courtesy of VA

The Future

"It is a lot easier to multiply headsets than mental health providers."

- Anne Lord Bailey
Wall Street Journal
April 16, 2023

THE FUTURE OF EVERYTHING

Confronting Your Fears in Virtual Reality Therapy

VR scenarios get more personal as doctors tailor therapy to individual experiences

Clinical Implementations: National Efforts

In-vivo exposure for PTSD
- 7 sites
- 75 headsets
- XR Health

Imaginal Prolonged Exposure
- 29 sites
- 29 headsets
- BraveMind/Soldier Strong

Chronic Pain and Suicide Prevention
- 60 sites
- 300 headsets
- Penumbra

At-home Management of Chronic Low Back Pain
- 16 sites
- 250 uses of 8-week regimen
- AppliedVR

Creative Arts Therapy
- 73 sites
- 460 Headsets
- Waya Health

Community Living Center
- 9 sites
- 45 headsets
- MyndVR

Physical Therapy Implementation
- 18 sites
- 56 headsets
- Penumbra/Soldier Strong

Radiology Phobias
- 5 sites
- 20 headsets
- XRHealth

Severe Social Avoidance
- 6 sites
- 12Headsets
- BehaVR

Sanctuary VR Validation
- 1 Site
- 5 headsets
- Firefly

Relaxation, Stress Reduction, and Positive Distraction in Veterans
- 2 sites
- 4 headsets
- InnateVR

Relaxation, Stress Reduction, and Positive Distraction in Veterans
- 1 site
- 3 headsets
- Magic Horizons

Staff Training and Education

- Prevention of Sexual Harassment

  - Assault and Harassment Prevention Office

  - 14 sites

- Inpatient Discharge Experience

  - Veterans Experience Office

  - 10 sites

- Firearms Safety Training

  - Office of Mental Health and Suicide Prevention

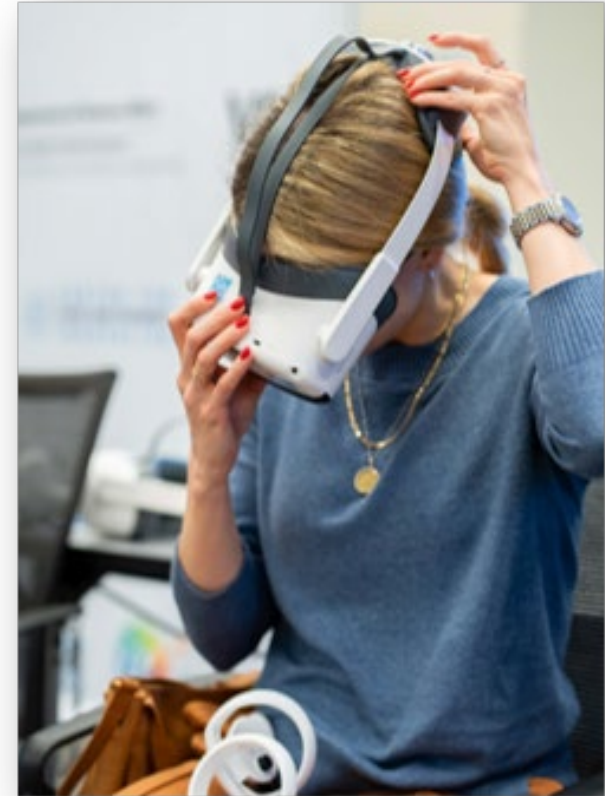 - Four sites

Photographs courtesy of VA

Collaborative Research and Development

- Eight Collaborations

- 24 unique VA sites

- 20 use cases

- Veteran and Clinician feedback

- Co-design, development

Photograph courtesy of VA

Roger Miller Video

https://youtu.be/DEsTHwEBAE8

Rational for Use

- Evidence exists to support use

  - Decades of academic research

  - Growing body of implementation evidence

- Engagement and adherence

- Increasingly native technology

Polling Question 3

Does evidence exist to support use of virtual reality in health care?

- Yes – a great deal of evidence
- Yes – but not much
- No
- I'm not sure

Evidence to Support

- Literature Review, Updated July 2023
  - Health Care
  - Physical Rehabilitation
  - Mental Health
  - Peer Support
  - Pain Management
  - Pulmonary Rehabilitation
  - Training and Education

Benefits:

- User engagement
- Cost savings
- Access to care
- Improvement in outcomes
- Scalability of remote technology
- Data collection
- Standardization of care

Barriers:

- Access to technology
- Limited training and education available
- Ease of design

Engagement and Adherence

- Veteran eXpeRience (VXR) Demo Days: Orlando, FL and Sheridan, WY

- 65 Veteran participants

- 63% had never used VR before

- Average experience rating: 8.0, with 10 being life-changing

- 94% said it was easy to use or very easy to use

- 91% said they'd like more VR incorporated into care at the hospital/clinic and into care at home

Photos courtesy of VA

Native Technology

ArmyTimes   News   Pay & Benefits   Flashpoints   Pentagon & Congress   Off Duty   Education & Transition   Veterans

FORT BELVOIR, Va. — The Army's mixed reality goggle is headed to soldiers in a three-step process in which developers expect two early versions released next year will help with redesigns for a third version to roll out across the Army.

The Integrated Visual Augmentation System, or IVAS, is a nearly $22 billion program that the Army is developing to bring night vision, thermal vision, tactical edge computing and the situational awareness of a fighter pilot down to the lowest-level infantry soldier. The device will likely be the most advanced single technology ever fielded exclusively to the close-combat, squad-level soldier in military history.

Demonstrations

Photos courtesy of VA

Precautions and Exclusions

- Severe frailty
- Active seizure disorder
- Active nausea or dizziness
- Active psychosis and/or delirium
- Complete legal blindness (unable to see anything) unless platform is specific for poor or low vision
- Head, neck, facial injury and/or surgery in the last six weeks that would interfere will safe and proper use
- Stroke and/or head trauma in the last six weeks that would interfere with proper and safe placement use of a VR system
- Any Veteran with active post-operative precautions and/or restrictions that would prevent safe use of a VR system

Cybersickness

Symptoms include but are not limited to:

- Eye strain
- Sudden fatigue
- Headache
- Dizziness, vertigo, nausea
- Nausea
- Blurred vision
- Anxiety
- Any exacerbation of pre-existing symptoms

(innovation.va.gov, n.d.)

Lessons Learned

Engaged Champions + Buy-in

Clinician training

Standard Operating Procedures + Infection Control

Standardized Documentation and Metrics

Wi-Fi Woes

Avoid Inequities

Security Needs

Collaboration

Build a Business Case

Key Takeaways

- Immersive technology, specifically virtual reality, is showing promise as a non-pharmacological approach to a host of clinical indications.

- Virtual reality is increasingly affordable and scalable.

- Embedding standardization and operationalization framework is critical to effectively scaling emerging technology like virtual reality.

Questions?

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To receive CE/CME credit, you must register by 0800 ET on 15 September 2023 to qualify for the receipt of CE/CME credit or certificate of attendance. You must complete the program posttest and evaluation before collecting your certificate. The posttest and evaluation will be available through 28 September 2023 at 2359 ET. Please complete the following steps to obtain CE/CME credit:

1. Go to URL: https://www.dhaj7-cepo.com/content/sep-2023-ccss

2. Search for your course using the Catalog, Calendar, or Find a course search tool.

3. Click on the REGISTER/TAKE COURSE tab.
   a. If you have previously used the CEPO CMS, click login.
   b. If you have not previously used the CEPO CMS click register to create a new account.

4. Follow the onscreen prompts to complete the post-activity assessments:
   a. Read the Accreditation Statement
   b. Complete the Evaluation
   c. Take the Posttest

5. After completing the posttest at 80% or above, your certificate will be available for print or download.

6. You can return to the site at any time in the future to print your certificate and transcripts at: https://www.dhaj7-cepo.com/

7. If you require further support, please contact us at: dha.ncr.j7.mbx.cepo-cms-support@health.mil