Chronic pain management: Virtual reality (VR)-based home therapy

About AppliedVR's RelieVRx®

AppliedVR is creating a new reality in healthcare. AppliedVR's treatments represent a robust approach to chronic lower back pain (CLBP) that empowers patients with an intuitive device they can self-manage at home. AppliedVR's RelieVRx® program is the first VR-based, prescription therapeutic to receive FDA's Breakthrough Device Designation and De Novo authorization for CLBP. AppliedVR's demonstrates a successful DHT for evidence generation, key stakeholder engagement, regulatory navigation, and reimbursement coverage.

Let's explore AppliedVR's journey through the lens of the Integrated Evidence Plan for digital health technologies toolkit - Stage B, highlighting the process, key decisions, and concepts that shaped their success.

Stage B: Evidence strategy & planning

- **Purpose and strategic objectives:** Demonstrate moderate to severe chronic non-malignant low back pain with a duration of three months or longer and meet regulatory and payor evidence expectations.
- **Evidence roadmap development:** AppliedVR developed an evidence roadmap that prioritized generating robust clinical data to support regulatory authorization and reimbursement. The roadmap included randomized controlled trials (RCTs), real-world evidence studies, and long-term outcome assessments to demonstrate the product's clinical effectiveness.
- **Evidence requirements:** Evidence was required to demonstrate clinical effectiveness, durability of results, and cost-effectiveness. The company focused on meeting FDA and CMS requirements by collecting high-quality clinical data on pain reduction, patient adherence, and long-term outcomes.
- **Evidence generation strategy:** Conducted a pivotal randomized, placebo-controlled trial to assess RelieVRx®'s effectiveness in reducing chronic pain intensity and pain-related interference. The study design incorporated a fully decentralized, self-administered treatment model, ensuring broad accessibility and real-world applicability. The clinical study compared immersive VR therapy (RelieVRx®) to a sham VR experience, allowing for a rigorous evaluation of treatment efficacy.
- **Test evidence plan and conduct gap analysis:** AppliedVR analyzed gaps in existing VR-based pain management studies and addressed them by ensuring a robust,

long-term follow-up in their clinical trials. A key aspect of the gap analysis was identifying the need for evidence supporting long-term pain reduction beyond the initial treatment period.

- **Implement the evidence plan and strategy:** Structured its clinical trials to include outcome measures aligned with payor and regulatory expectations.
    - **Study aim:**
        - Assess differences between the RelieVRx® and sham VR groups and to measure changes in pain intensity and pain-related interference with activity, sleep, mood and stress from baseline to the end of the treatment, and ultimately to 24-months post-treatment.
    - **Clinical study design:**
        - Conducted a fully decentralized, double-blind, parallel-arm, randomized, placebo-controlled trial during the COVID-19 pandemic, involving 188 participants with moderate to severe chronic low back pain.
        - The immersive RelieVRx® program delivered therapeutic VR experiences lasting 2 to 16 minutes (averaging 6 minutes per session), while the sham VR delivered 2D, non-immersive nature content with similar duration
    - **Key outcomes:**
        - **Significant clinically meaningful pain reduction:**
            - At the end of treatment, RelieVRx® participants experienced:
                - **2.2-point reduction** in average pain intensity,
                - **2.5-2.6-point reduction** in pain-related interference with activity, mood, stress, and sleep.
            - Nearly **half of the patients** (46%) in the treatment group **experienced a 71% reduction in pain intensity** on average.
        - **Durability of Results:**
            - At **24 months post-treatment**, over **60%** maintained a **≥2-point** reduction in pain intensity, pain interference, or both.
- **Risk management:** No adverse events, including nausea or motion sickness, were reported by study participants.

By the end of stage B, AppliedVR had:

✔ Engaged with the FDA via pre-submission to build evidence, and submit for De Novo market authorization.	✔ **Regulatory strategy**
✔ Secured FDA De Novo authorization in November 2021 making it the first FDA-granted immersive VR therapeutic for chronic lower back pain.	✔ **Regulatory strategy**
✔ In 2022, AppliedVR worked with CMS to classify RelieVRx® as Durable Medical Equipment (DME), ensuring alignment with Medicare reimbursement frameworks.	✔ **Reimbursement pathway**
✔ In 2023, CMS determined RelieVRx® qualified under the Durable Medical Equipment (DME) benefit category, a critical step for ensuring Medicare coverage.	✔ **Reimbursement pathway**
✔ AppliedVR engaged with the United States Department of Veterans Affairs (VA) to improve the quality of life of veterans by exploring the use of drug-free virtual reality programs.	✔ **Business priorities**

The case example was developed based on public information only (Website, press releases, report, & interviews).