

Extended Reality (XR) in Digital Medicine

Translational Challenges and Collaborative Approaches

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Extended reality (XR), which includes virtual reality (VR), augmented reality (AR), and mixed reality (MR), is increasingly being explored for healthcare applications such as rehabilitation, surgical planning, pain management, mental health, and clinical training. As XR technologies advance, successful integration into healthcare requires the consideration of clinical evidence, regulatory requirements, reimbursement opportunities, and implementation within healthcare systems.

Why Is This Important?

Although XR technologies have demonstrated potential across a variety of clinical applications, several factors can affect the translation from development to routine clinical use. Considerations include:

- Access to clinical research infrastructure
- Availability of funding
- Regulatory requirements for medical devices
- Reimbursement opportunities
- Collaboration between developers, researchers, and healthcare providers

Collaborative Approaches

Potential collaborative strategies include:

- Partnerships between developers and researchers.
- Shared research infrastructure and clinical expertise.
- Timely consideration of regulatory and reimbursement planning.
- Support for study design and grant development.
- Student engagement through experiential learning opportunities.
- Coordination of research activities to support evidence generation.

Translational Challenges

Based on discussions with 21 innovators, entrepreneurs, and academics:

- 10 reported having at least one commercialized product
- 15 applied for state or federal funding
- 17 identified continued research as a high priority
- 12 reported limited funding for research

These interviews identified five recurring challenges: human subjects research, partnerships and collaborations, funding, commercialization, and regulatory pathways.

Why It Matters

- May strengthen collaboration between industry and academia.
- May improve access to research expertise and infrastructure.
- May support the generation of clinical evidence.
- May facilitate regulatory and reimbursement planning.
- May reduce excess effort during technology development.

Collaborative approaches have the potential to support the evaluation and implementation of XR technologies within healthcare settings.

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