Coming to a (Small) Screen Near You
## - Virtual Reality Gets Personal in Healthcare -

-- Rick Krohn, MA, MAS

President, HealthSense, co-author with David Metcalf, PhD of a new eBook, "Wearables and the IoT in Healthcare" --

Virtual Reality - the term conjures up a number of images. For the millennial, it's gaming; for those of a certain age, it's 3D glasses; and for all of us, it's an ever-expanding template for immersive entertainment. "VR" is rapidly evolving however, and today serves as an umbrella for related technologies including augmented reality ("AR") and 3D. These collective components of VR

while VR aims to immerse the user into a computer generated virtual world, in AR virtual computer generated objects are added to the real physical space.

"VR" technology is actually almost a century old, and until recently has been most recognizably a feature of mass market entertainment. But today, with the release of head mounted displays

dubbed VR and AR "the next technology megatrend" with "the potential to make every computer and entertainment interface disappear." Until recently, healthcare was not a headliner for VR investment, mainly due to the expense and lack of demonstrated scalability of VR solutions aimed at a patient base. But as healthcare pivots towards a retail marketplace, that economic calculus changes. According to Goldman Sachs, healthcare VR applications are forecast to top $5.1 billion in sales by 2025, with 3.4 million active users, including 1.5 million medical professionals.
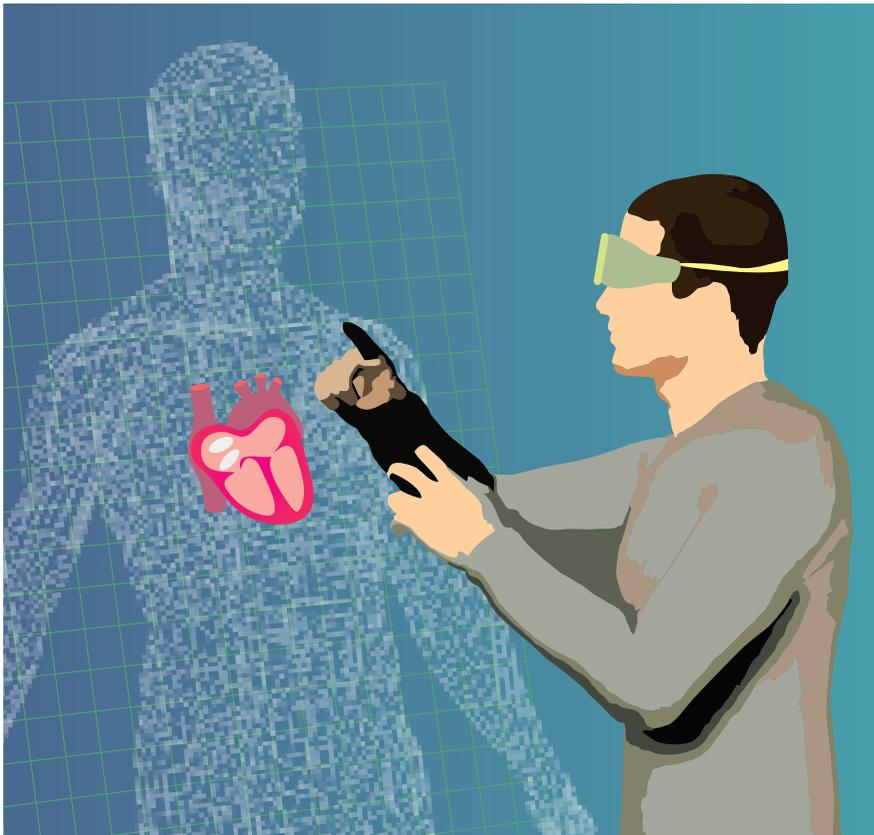
> Virtual Reality is a century-old idea that has evolved from a mass market entertainment medium to a personalized, immersive class of technologies.

can be described as: a) VR - an artificial environment created with software and presented to the user in such a way that the user suspends belief and accepts it as a real environment; b) AR - the integration of digital information with the live video of the user's environment in real-time (AR takes an existing visual digital feed and blends new information to create an augmented environment); and c) 3D - which displays an image in three dimensions. The VR/AR distinction:

like Facebook's Oculus and Samsung's Gear, VR technology has advanced to the point where consumer facing, immersive VR experiences are accessible at reasonable price points. VR is now personal and highly interactive - we can now enter a computer-generated simulation of a three-dimensional world, using helmets, gloves and other sensors to interact with this virtual environment.

Piper Jaffray analyst, Gene Munster, has

To date, VR has gotten traction in healthcare mainly as a training and education device. Unlike a textbook or a classroom demonstration, VR in healthcare education introduces a visual, participatory experience featuring accurate and realistic simulations. In medical training VR can take the risk out of complex medical procedures, bringing students close to the procedure while still leaving the actual work in the hands of the expert guide. Not surprisingly then, VR is getting its greatest traction in the healthcare enterprise.

In other healthcare verticals however, it's still early days for VR. In the physician office, in biopharma, and in the consumer (retail) space, VR development is still largely in the pilot and boutique solution stage. That said, industry-wide, it's a green field for innovation. Some opportunities:

VR in the Physician Office

- Behavior change
- Virtual diagnosis
- Education and prevention

VR in Pharma

- PTSD
- Rehabilitation
- Pain management
- Drug efficacy

VR/AR applications for patients and consumers

- Immersive health/wellness
- Gamification
- Brain injuries
- Behavioral health (ex. anxiety, body image, phobia)
- Chronic disease management

Though early days, even today there are some VR footholds in healthcare - among the leaders are the VA and DoD, who are leading development of VR and AR healthcare apps to address field medicine, PTSD, rehabilitation, pain management and behavioral health. On the commercial side, institutions like the Cleveland Clinic have developed VR to treat Parkinson's Disease, and St. Jude Children's Research Hospital has developed a virtual experience to treat cancer patients. Players like Cigna have created an innovative 3D meditative experience and Florida BCBS teamed with Disney to produce Habit Heroes, an immersive healthy lifestyle experience aimed at kids.

We've only scratched the surface of VR's potential to disrupt healthcare delivery. New revenue, cost savings and quality gains can be captured across multiple verticals - health system, provider, pharma, payer and the consumer. VR not only leverages market trends like population health, consumerization, value metrics, risk management and personalized care, it introduces opportunities to create retail solutions, to drive patient and consumer engagement strategies, to support patient enrollment and member retention, and as a tool to promote sales, alliances

A. SECTORS	B. DEVICES
First Responders (Police, Fire, EMS)	Google Glass
Emergency Department (ER, Dr., Nurse, etc.)	Vuzix
Neurology (Telestroke)	Sony
Teletrauma (Primary Survey, Resuscitation & FAST)	Atheer
Operating Rooms	Microsoft Hololens
Interventional Radiology	Magic Leap
Cardiologists	Pivot Head, GoPro, LoupeCam, Designs for Vision NanoCam

Source: "Health-e Everything: Wearables and the IoT for Healthcare", Krohn and Metcalf, Editors

and networks. Clinical opportunities include provider and patient education, best practices, wellness and prevention, behavioral health, chronic disease management, rehabilitation and drug therapy.

There are of course hurdles to VR's broadcast adoption in healthcare. First, new technology aversion - VR is a young technology not easily deployed in enterprise environments due to infrastructure, integration and equipment costs. Next, there is pushback from physicians unaccustomed to retail solutions, many of which have a short or nonexistent catalog of success. And since VR is largely a retail play, it's still unclear that VR can deliver a truly engaging augmented reality experience in a practical, affordable, consumer-ready device. Finally, there are the ever-present issues of privacy, security, and validation.

To achieve scale in healthcare, VR developers must act strategically. VR can leverage proven techniques to weave itself into the fabric of healthcare delivery through gamification, social media, narrative, visioning, goal setting and rewards. It can score early wins by addressing population health issues such as childhood obesity, replacement drug therapy, and smoking cessation. But VR solution developers must know the customer - younger gens and millennials will be more receptive and comfortable with virtual worlds. They must architect VR technologies to immersive experience and delivery capabilities (i.e. mobile). They must mitigate cost, development and adoption through partnerships and affordable-device enablement. And they must recognize that from clinical education to marketing, technology isn't the centerpiece of the VR solution - the message or the story is.

About the Author

Rick Krohn is an expert in mHealth corporate strategy and business development, strategic marketing and multi-channel communications, technology-enabled transformation, alliances, new products and new ventures, digital innovation, project management and thought leadership, whose consulting experience spans the healthcare, telecommunications, education and technology fields. He is the author of more than 100 articles on a wide range of health technology topics and 2 HIMSS books detailing mHealth Innovation. His latest eBook titled "Health-e Everything: Wearables and the IoT for Health", is available in iBooks and Amazon. He can be reached at 912.220.6563 and rkrohn@healthsen.com. ~