



## Backgrounder

Virtual reality medical and surgical simulators are revolutionizing healthcare training and education. This paradigm shift in how medical and surgical procedures are being taught is led by advances in technology — and by hospitals, medical societies, insurance companies, and government healthcare agencies searching for ways to improve patient care, reduce risk, and decrease healthcare and malpractice insurance costs. The days of “see one, do one, teach one” are being replaced by virtual reality medical and surgical simulators, reducing the need to practice on real patients.

### History

Headquartered in Gaithersburg, Maryland, in the Washington D.C. metropolitan area, Immersion Medical was created in 2000 by pooling the interests of Immersion Corporation and HT Medical Systems, Inc. The vision was to combine Immersion Corporation’s sensory interaction technology with HT Medical’s simulation technology to create virtual reality simulators with tactile feedback for training of medical and surgical procedures.

### Virtual Reality Surgical Simulation

Immersion Medical is a leader in medical and surgical simulation. The company’s virtual reality simulators supply realistic training environments using advanced, physics-based, 3D computer models and graphics, high-fidelity sound, and realistic tactile feedback. Leading physicians guide Immersion Medical clinicians and engineers in rendering the look and feel of the procedures, producing simulations of remarkable realism. The simulators allow healthcare professionals to acquire, maintain, and improve their technique in an environment that poses no risk to patients, where mistakes have no dire consequences, and where animal use is avoided.

Immersion Medical Surgical Simulators:

#### LaparoscopyVR™ System

Designed using the Fundamentals of Laparoscopic Surgery (FLS) suggested curricula and scope of procedures endorsed by the Society of American Gastrointestinal Endoscopic Surgeons (SAGES), the LapVR™ System provides training for minimally invasive procedures. It is the first laparoscopic surgical simulator designed to be a complete system with tightly integrated Immersion TouchSense®-enabled haptic hardware and physics-based software. The system, actually a platform for the development of a wide range of procedures, currently includes Essential Skills, Laparoscopy Cholecystectomy, Running the Bowel, Adhesiolysis, Ectopic Pregnancy, Tubal Ligation, Salpinga Oophorectomy, and Administration modules.

### **CathLabVR™ System**

Provides training of the necessary skills needed for navigating diverse vascular anatomy and applying cardiac therapies including percutaneous coronary and peripheral interventions, cardiac rhythm management, and transcatheter pulmonary and aortic valve replacement.

### **Endoscopy AccuTouch® System**

Provides training in flexible bronchoscopy and upper and lower gastrointestinal flexible endoscopy, including bronchial alveolar lavage, transbronchial needle aspiration, pediatric difficult airways, colonoscopy, polypectomy, and endoscopic retrograde cholangiography.

### **Virtual IV System**

Provides training in intravenous access and phlebotomy for adults, geriatric patients, and infants.

### **Corporate Special Projects**

Corporations wanting to train customers or sales staff on medical procedures and on the use of new tools and medical devices engage Immersion Medical to create special simulators. For example, Immersion Medical has developed specialized simulation procedures for Medtronic, Laerdal, Terumo, and others. Special projects completed by Immersion Medical have included venous access, minimally invasive vein harvesting, hysteroscopy, and aortic valve and pacemaker implantation.

### **Customers**

Today, Immersion Medical simulators are being used worldwide in surgical simulation centers, military settings, institutions of distinction, and centers of excellence such as Johns Hopkins, Emory University, Mayo Clinic – Rochester, Duke University Medical Center, Walter Reed Army Medical Center, University of Kentucky, Yale University, Hong Kong Polytechnic University, and St. Mary's Imperial College.

### **Clinical Studies**

A number of clinical studies validate the effectiveness of surgical simulators in general, and Immersion Medical simulators in particular. Various studies conclude that training on medical simulators:

- Allows more rapid acquisition of expertise compared with conventional training methods.
- Enables novice trainees to attain a level of manual and technical skill similar to those of colleagues with several years of experience.
- Allows fellows trained on simulators to outperform traditionally trained fellows.
- Reduces the number of procedures required to reach competency.
- Improves objective evaluation of skills.
- Potentially provides an important tool for competency assessment, continuing physician training, and general medical education.
- Reduces the time for procedural completion.
- Reduces the cost of repairs for medical equipment by teaching handling techniques.
- Allows residents trained on simulators to perform procedures with less patient discomfort.

### **Reducing Healthcare Costs**

With the current focus on the rising cost of healthcare, innovations that can decrease these costs are in high demand. According to data released by the National Patient Safety Benchmarking Center, surgical mistakes are the most costly and frequent type of medical errors. In a 200-bed hospital, costs being passed on to patients from surgical errors total between \$10 and \$12 million annually.<sup>1</sup> Immersion Medical simulators can help decrease surgical errors by training and testing surgical residents to a level of proficiency before they enter the operating room. In addition, a Frost & Sullivan ROI study has found that Immersion Medical simulators enable procedural and instructor time savings, a reduction in procedural errors, and faster time to competence, all of which can translate into fast payback (less than six months) for hospitals and teaching institutions.<sup>2</sup>

### **Recording and Evaluating Metrics**

Immersion Medical's surgical simulators integrated into a medical training program supply a convenient and effective administrative solution for testing and certification. Immersion Medical's simulators contribute to improved patient care by providing the opportunity to practice the cognitive and technical skills of a procedure to a criterion level of proficiency before performing on patients. The proficiency level can be determined by many metrics captured by each of our systems, and these metrics can be fine-tuned for individual needs. Our simulators record user movements, time, precision, and errors, in order to track progression, assess trouble areas, and support development early in the training process.

### **Higher Training Standards with Less Time for Practice**

Medical societies are increasing their standards of care to match consumer demand for safe and efficient healthcare. The American Board of Surgery has increased the requirements for graduating residents to complete 85 flexible endoscopy (gastrointestinal) procedures (50 lower, 35 upper) beginning with the class of 2009. However, the Accreditation Council for Graduate Medical Education (ACGME) has limited the training time for residents to 80 hours per week. Surgeons now need increased training in complex procedures, but must get this training in a limited number of hours. A virtual reality "patient" can be available at all hours of the day for unlimited practice time and can also ensure that residents receive broad experience, rather than solely depending on cases they happen to encounter during their shift. Immersion Medical virtual reality surgical simulators include a wide array of cases representing several levels of difficulty.

Simulation training benefits extend to practicing physicians as well, who can use virtual reality to practice infrequent complications to help keep their skills fresh. Simulators can also help practicing physicians become familiar with new devices and procedures, and hospitals can use them in their processes for certifying or validating physician knowledge and skills.

### **Immersion Medical's Strategy**

Built on a legacy of sensory interaction and medical virtual reality simulation, Immersion Medical provides an innovative and nonsubjective way to administer and assess training in centers worldwide. Proud of our history in the medical simulation industry and committed to creating products that make a difference in health care outcomes, we remain dedicated to industry leadership, innovation, and high standards of excellence and look forward to making future contributions.

## Additional Resources and Links

More information about Immersion Medical, Inc. can be found at [www.ImmersionMedical.com](http://www.ImmersionMedical.com)

NASDAQ symbol: IMMR, for stock price go to [immr.client.shareholder.com](http://immr.client.shareholder.com)

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<sup>1</sup> Safety-Centered Solutions, Inc., *Medical Errors: Frequency, Costs, and Systemic Causes: A Comprehensive Solution*, presented to The First National HIPAA Summit, October 17, 2000.

<sup>2</sup> Return on Investment Study for Medical Simulation Training, A Frost & Sullivan report performed in conjunction with the American Hospital Association Health Research & Educational Trust, sponsored by Immersion Medical, Inc., 2004.

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