

## Virtual ACS 2021 Surgeons and Engineers: A Dialogue on Surgical Simulation Meeting

### Research In-Progress

#### VR Arthroscopic Simulation Training and Financial Return

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**Introduction:** Virtual reality arthroscopy simulators were developed to improve the surgical skills of orthopedic residents by providing a cost-competitive training opportunity in a low stress environment. These simulators, however, are expensive and typically require maintenance contracts. One simulator company advertises that every time the simulator is used, the residency program saves \$200-\$300. We hypothesize that orthopedic residency programs that do not explicitly integrate an arthroscopy simulator in their training curriculum see low simulator usage and less cost benefit.

**Methods:** Log data were retrieved from VR arthroscopy simulators at multiple U.S. orthopedic residency programs. The simulator log data were consolidated for each institution to find the total hours of simulator use. Additional metrics such as the average time of simulation and an annual breakdown of simulation time were computed. Each institution also provided information on how their curriculum incorporated simulator training, as well as when their VR simulator was available for training on residents' free time.

**Preliminary Results:** Of eight orthopedic residency programs contacted, six have contributed to the initial results (Figure 1). The University of Iowa residency program utilized their VR simulator  $26.8 \pm 25.2$  hours per year over a five-year period. Factoring in the initial purchase price and annual maintenance costs for the simulator, each hour of simulator use cost \$1,482. Institutions 1, 2, and 3 saw respective costs of \$61,439, \$3,545, and \$4,152 per hour of simulation use. All institutions make their VR simulators available for use by residents at any time. Institutions 3 and 5 required that residents use the simulator as part of their residency curriculum

**Next Steps:** Additional orthopedic residency programs have been contacted to retrieve their VR simulator log data. All programs will also be sent a survey to determine detailed use of their simulator and specific simulator expenses for further cost benefit analysis.

**Figure 1.** This chart shows the annual breakdown for hours of simulator use and how it varied by institution.

