A virtual patient (VP) is a computer simulation used for medical education and assessment where the learner plays the role of a health care provider by interacting with an on-screen patient. This typically includes interviewing, examining, selecting tests, making a diagnosis, and prescribing therapy.

A recent comprehensive analysis of VP literature published in Medical Education by D. Cook and M. Triola suggested that VPs are best for teaching, practicing, and assessing clinical decision-making. This is an important finding because few modalities outside of bedside teaching by master clinicians are capable of teaching and evaluating this critical skill.

The Lab for Educational Technology (Lab) conducted focus groups and interviews with faculty, recognizing a need for complex branching VP cases where the learner’s clinical decisions determine the patient’s outcome. These “branched-narrative” VPs allow for repeated, determined practice and individualized feedback based on the learner’s decisions. In 2009, MedBiquitous, a medical education standards-making organization, completed work on an XML-based data standard that allows sharing and repurposing of VP cases between institutions and systems.

Our objective was to create and validate an easy-to-use authoring and player system for branched-narrative VPs that is compliant with the MedBiquitous VP standard.

**METHODS**

The Lab used interviews and focus groups to determine the educational, creative, and technical needs for a VP simulation software tool. We examined existing methods for authoring VPs, including our own linear-narrative system, VUE, Labyrinth, and Adobe Captivate. Finding these inadequate for authoring branched-narrative VPs, the Lab designed, developed and extensively tested a new VP authoring tool, which we called vpSim.

**RESULTS**

vpSim is a web-based software application that allows medical educators without specialized technical skills to independently create branched-narrative virtual patients using only a web browser.

The significant and unique features of vpSim are that it:

- was designed and developed by health care educators for health care educators
- reduces case development time and cost by up to 1/10th, with an intuitive user interface that includes a graphical “node map” to lay out the case branches and paths; provides simple web forms for entering clinical details; and includes templates with default data for VP history, physical exam, labs, imaging, and therapy
- requires no hardware or software installation — the authoring, playback, and administration are entirely web-based
- can deploy and manage cases across multiple courses, groups, and institutions
- tracks learner performance based on time, score, and money
- imports and exports VP cases using the MedBiquitous standard

**vpSim Use Around the World.** vpSim was beta-tested by more than 100 users at 23 institutions, in seven countries, producing a total of 125 cases. Examples of successful implementation include the School of Pharmacy at the University of Pittsburgh and St. George’s Medical School in London, which converted all paper-based PBL cases in September of 2009 and introduced them into the medical student curriculum in November, and a workshop at the Society for General Internal Medicine's annual meeting. Feedback from surveys, beta-testers, focus groups, students, and faculty confirm that the ease-of-use and creative criteria for vpSim were met.

**CONCLUSIONS**

vpSim represents a major advance in authoring of VPs, in particular branched-narrative style cases, and is compatible with the MedBiquitous VP data standard. This enables vpSim to exchange cases between other compliant systems including the 320 cases from the eViP consortium.