Chapter 12
Virtual Patients in Health Professions Education

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ABSTRACT

The field of health professions continues to struggle with the impact of increasing practitioner and educator shortages. Health professions education is also faced with the issues of limited clinical placements and an increasing demand for online education. To address these issues, health professions educators have increasingly turned to simulations to provide experiential learning in safe, controlled environments. One of the newest simulation technology innovations to emerge is that of virtual patient simulations. This chapter reviews the context in which virtual patients have emerged, the range of virtual patient technologies available, and the ways in which health professions educators currently use virtual patient simulations.

INTRODUCTION

Healthcare in America is at a crossroads. As the population of the United States ages, more healthcare providers are needed, yet these same aging citizens are retiring from their healthcare careers. As a result, there are significant and imminent shortages in many fields of the health professions (Kreitzer, Kligler, & Meeker, 2009). The Bureau of Labor Statistics (2013) has identified registered nurses, licensed practical and licensed vocational nurses, home health aids, and nursing assistants as being among the occupations with the largest projected number of job openings due to growth and replacement needs. Nearly one-third of current registered nurses will reach retirement age within the coming decade (Health Resources and Services Administration, 2013). Family physicians and general internists are also facing similar shortages due to the increasing and aging population (Colwill, Cultice, & Kruse, 2008; Salsberg & Grover, 2006). However, to exacerbate the issue, there are shortages of health professions educators as well, and educational institutions cannot meet the demand of those applying to their programs (Dutile, Wright, & Beauchesne, 2011; Mancuso-Murphy, 2007; Salsberg & Grover, 2006). Another issue faced by health professions educators is the limited availability of clinical placements for their students (Hall, 2006;

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Kassam, Kwong, & Collins, 2013). In addition, these challenges in health professions education must be addressed within the context of an increasing demand for nontraditional educational programs, as health professions education is experiencing the fastest growing online enrollments of any field (Lytle, 2011).

Though health professions education programs struggle with high demand and limited resources in changing educational environments, they must still teach the knowledge, skills, and attitudes necessary to produce competent and safe professionals. To help meet the demand for the comprehensive education necessary to educate these health professionals, health professions educators have turned to simulations as a way to provide some portion of the experience in clinical environments necessary to develop safe and effective procedural, communication, and clinical reasoning skills (Aggarwal et al., 2010; Forsberg, Georg, Ziegert, & Fors, 2011; Guise, Chambers, Conradi, Kavia, & Välimäki, 2012; Schmidt, Goldhaber-Fiebert, Ho, & McDonald, 2013; Wilt & King, 2012). Although task trainers, roleplaying, standardized patients, and high-fidelity manikins have been used in the health professions for decades, a more recent development in healthcare simulations is that of virtual patients (Cendan & Lok, 2012; Cook, Erwin, & Triola, 2010; Rosen, 2008). The objective of this chapter is to document the emergence of virtual patient simulation in health professions education, and to define the range of technologies within this category of clinical simulation.

BACKGROUND

Medical errors are a significant cause of patient harm and morbidity in health care today (E. J. Lewis, Baernholdt, & Hamric, 2013). In the education of health professionals, faculty of all disciplines seek to teach their students the diagnostic reasoning and communication skills, and to foster the teamwork and self-confidence needed to provide safe and effective care in order to prevent these errors (Consorti, Mancuso, Nocioni, & Piccolo, 2012; Cook et al., 2010). Simulation is an established and effective method of providing a safe, risk-free environment where students can practice new skills and apply new knowledge without posing a threat to actual patients (Nehring & Lashley, 2009). There is strong evidence that the use of simulation can meet identified learning objectives and increase self-reported measures of engagement, satisfaction, and self-confidence (Arnold, Johnson, Tucker, Chesak, & Dierkhising, 2011; Cook et al., 2010; Howard, Englert, Kameg, & Perozzi, 2011). Existing literature also identifies simulation as an effective educational strategy for the achievement of patient safety learning outcomes (Blum & Parcells, 2012; Cook et al., 2012; Thornock, 2013). Simulation has been identified by anesthesiology researchers as a successful strategy for improving patient safety, decreasing patient morbidity, identifying latent errors, and facilitating improvements to process (Aebersold & Tschannen, 2013; Shear, Greenberg, & Tokarczyk, 2013). While it is difficult to pinpoint simulation as the cause of decreased medical errors, Durham and Alden (2008) described patient safety as a complex concept that includes not only the prevention of medical errors, but also the development of critical thinking and decision-making, effective communication, and the promotion of teamwork, all of which have been identified as outcomes achieved through the use of simulations (Aggarwal et al., 2010; Stanley & Latimer, 2011; Stevens et al., 2006; Stroup, 2014; Sweigart, Burden, Carlton, & Fillwalk, 2014).

Medical education began using human patient simulation at the turn of 20th century (Bradley, 2006). The subsequent introductions of mathematical descriptions of pathophysiology and the development of virtual worlds further advanced the uses of simulations in health professions education, and the environments in which they are conducted (Rosen, 2008). However, the use of manikins, standardized patients,