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## Benefits of Integrating High-Fidelity Simulation into nurse Practitioner Graduate Programs and Continuing Education Courses: Patient Safety

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BENEFITS OF INTEGRATING INTERDISCIPLINARY HIGH FIDELITY  
SIMULATION INTO NURSE PRACTITIONER GRADUATE PROGRAMS AND  
CONTINUING EDUCATION COURSES: PATIENT SAFETY

by

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Bachelor of Science, University of North Dakota, 2004

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for the degree of

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APPROVAL PAGE

This independent study, submitted by Ann L. Mason in partial fulfillment of the requirements for the Degree of Master of Science from the University of North Dakota, has been read by a Faculty Advisor under whom the work has been done and is hereby approved.

Cindy Anderson 4/27/11  
Faculty Advisor

Ann L. Mason  
4/27/11

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Department: Nursing

Degree: Master of Science

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Benefits of Integrating Interdisciplinary High Fidelity Simulation into Nurse Practitioner

Graduate Programs and Continuing Education Courses: Patient Safety

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## Abstract

Today's health care environment is changing quickly with advancement in technology and complexity of patient care management. As a result, many universities and health care facilities are integrating the use of high fidelity simulation into their curriculum to increase patient safety with the evidence of 35 years of success from other disciplines such as the military and aviation. Evidence of positive outcomes with use of high fidelity simulation is emerging and includes improved interdisciplinary interaction, enhanced critical thinking, self efficacy and overall increased patient safety in a non-threatening environment. These findings are innovative and should be disseminated to nurse practitioners and educators so that the integration of high fidelity simulation into graduate nurse practitioner curricula and continuing education programs can translate to positive patient safety outcomes.

Key words: simulation, interdisciplinary, nurse practitioner, self efficacy, critical thinking, patient safety

## Introduction

The Institute of Medicine (IOM) has estimated that 44,000-98,000 patients in the United States die every year as a result of medical error.<sup>1</sup> The majority of those deaths have been associated with weak of communication skills, poor interdisciplinary dynamics, and human error, including skill based, rule based, and knowledge based error.<sup>2-5</sup> Patient safety campaigns have been developed to decrease unnecessary deaths related to medical errors such as the IOM's 100,000 Lives Campaign, supported by the Agency for Healthcare Research and Quality (AHRQ), and the Joint Commission's National Patient Safety Goal initiative.<sup>6</sup> Obligation to patient safety is reinforced in medical and nursing curricula through teaching pedagogies which include lectures, small group projects, case studies, journaling, case presentations, and high fidelity simulation.<sup>7-9</sup> Despite these campaigns and teaching strategies, medical errors continue to occur, prompting necessary changes in the way all healthcare professionals are being educated through undergraduate and graduate academic programs and continuing education courses. An alternative teaching pedagogy integrated into curricula that places emphasis on patient safety by improving interdisciplinary dynamics is high fidelity simulation.<sup>1,4,10,11</sup>

High fidelity simulation is a presentation of reality in a controlled environment.<sup>17</sup> Fidelity in relation to simulation refers to the extent to which a simulation mimics reality. In high fidelity simulation, computerized mannequins mimic real-life situations such as pupil dilation, increase or decrease in urine output, and the mannequin's chest rising and falling.<sup>18</sup> High fidelity simulation attempts to replicate situations that may occur during patient care. The expectation at the end of the simulation experience is enhanced

preparation for practitioners encounter of similar situations in an actual clinical setting, enhancing management, safety and communication of complex clinical situations.

Interdisciplinary education by means of high fidelity simulation has been incorporated in a number of disciplines and has made a fundamental impact on reduction of safety errors in aviation and military training.<sup>11</sup> Healthcare professionals recognize the patient safety impact of interdisciplinary education through high fidelity simulation and are integrating interdisciplinary education into curricula.<sup>10,12</sup> Interdisciplinary approach to healthcare involves different professions contributing to the goal of patient care through mutual trust, respect, and clear role of responsibilities of each member.<sup>13</sup> Outcomes of integration high fidelity simulation in education include improved interdisciplinary dynamics of collaboration, communication, cognitive and critical thinking skills and self efficacy to improve patient safety.<sup>14-16</sup>

The focus of this article is to provide the basis for evidence on the outcomes of the integration of interdisciplinary high fidelity simulation into nurse practitioner graduate curricula and continuing education courses to increase patient safety.

### **Search Strategies**

An electronic search was conducted utilizing databases including PubMed, CINAHL, and MEDLINE. Key words utilized in the search included high fidelity simulation, patient safety, nurse practitioner, interdisciplinary, and self efficacy. The Google search engine was also utilized to search for journals found on reference lists. A limitation was set in the literature search for English as the primary language, articles published in peer-reviewed journals as well as the date of publication of peer-reviewed journals from the past 5 years unless older references were seminal. Key words utilized in

the search included high fidelity simulation, patient safety, nurse practitioner, interdisciplinary, and self efficacy.

The result of the search were data based articles from a variety of nursing specializations (anesthesia, critical care, perinatal and neonatal), across educational levels (academic and continuing education) and practice (nurse practitioner and clinical nurse specialist). Peer-reviewed publications were reviewed from medical, staff development, quality and safety, and risk management literature. The search included studies involving medical students, nursing students, medical residents, physicians, and Certified Registered Nurse Anesthetist (CRNA) that were a part of interdisciplinary groups. The evidence cited in this paper points to the benefits of interdisciplinary collaboration, cognitive and critical thinking, and self efficacy leading to enhanced patient safety through the development of high fidelity simulation training curricula and programs. The search provided insight on the lack of integration of interdisciplinary high fidelity simulation into nurse practitioner curricula concluding essential integration of nurse practitioners into interdisciplinary education through high fidelity simulation for improvement in patient safety outcomes.

### **High Fidelity Simulation: Models that Work**

Integration of high fidelity simulation into undergraduate nursing programs provides an opportunity for additional education needed to address patient safety issues due to human error in communication and poor collaboration with other healthcare professionals.<sup>19-21</sup> Disciplines such as aviation, medicine and anesthesia have identified inadequate communication skills, poor interdisciplinary teamwork and human error as safety issues. The aviation industry has been a leader in the use of high fidelity simulation

for the last 35 years as a tool to develop potential solutions for safety concerns. One such example of use of high fidelity simulation in aviation designed training curriculum is known as Crew Resource Management (CRM)<sup>2,22</sup> CRM is team training in aviation designed for recognition and utilization of all available resources for safe flight operations and focuses on non-technical team skills such as attitudes and behavior of crew members and the impact behavior has on flight safety.<sup>2,23</sup> Findings from CRM indicate that most flight errors are not from a single person alone, but rather associated with ineffective communication, poor group decision making, and inadequate leadership, similar to errors that occur in the healthcare setting.<sup>2</sup>

### **High Fidelity Simulation in Nursing Education**

The lessons learned from the use of high-fidelity simulation in aviation can be applied to patient safety in health care, enhancing the effectiveness of collaboration and communication among interdisciplinary health care teams. The critical interdisciplinary dynamics and effective communication skills used in aviation and the military are equally critical in health care. It is essential for health care professionals to gain leadership in integration of interdisciplinary high fidelity simulation into curricula for enhanced emphasis on patient safety through improved communication and team dynamics.

Nursing has utilized low technology simulation for many years for the purpose of skill attainment. However, with the increase in patient acuity and patient safety concerns, nursing curricula and continuing nursing education courses have integrated high fidelity simulation to provide a close-to-life situation to enhance the students' critical thinking skills for enhanced safety.<sup>18</sup> The anticipated outcome of high-fidelity simulation is that nursing students and practitioners gain and improve communication and critical thinking

skills, as well as increased self efficacy in a safe, non-threatening, experiential environment.<sup>24-26</sup> For advanced practice nurses, the incorporation of evidence-based interventions is central to reducing medical errors and improving patient safety.

Integration of interdisciplinary high fidelity simulation into university academics and hospital-based education is on the rise. The majority of the health care users employing high fidelity simulation are undergraduate nursing students, medical students and residents, hospital staff members and CRNAs. Nurse practitioner students and practicing nurse practitioners have not been as fully integrated into interdisciplinary high fidelity simulation despite the knowledge of improved outcomes in patient safety through effective communication and collaboration.

### **High Fidelity Simulation to Improve Interdisciplinary Collaboration**

NPs and physicians have worked collaboratively in the management of patient care for many years; however, barriers still exist among these two provider groups which have the potential for poor patient outcomes and management. A review of literature by Clarin<sup>27</sup> found a common theme in the barriers to effective nurse practitioner and physician collaboration that included, lack of physician knowledge on NP scope of practice and NP role regarding such things as prescribing, performing physical examinations, and ordering laboratory studies, as well as poor physician attitude toward NPs, lack of respect for the educational background and hierarchy surrounding physician practice, and poor written and verbal communication between providers affecting quality of patient care.<sup>27</sup> A limitation of this review was that misconceptions of NP's attitudes of physicians were not addressed, which could also affect collaboration and thus patient safety. Despite their shared roles in patient management and safety, barriers still exist

between physicians and NPs and include lack of knowledge of scope of practice, poor attitudes, lack of respect, and poor communication. Integration of interdisciplinary high fidelity simulation that includes physicians and NPs has the potential to reduce barriers and safety concern.<sup>27</sup>

High fidelity simulation in interdisciplinary education is one strategy for NPs and physicians that may be used to identify roles and increase knowledge of mutual scopes of practice. Interdisciplinary education using high fidelity simulation is on the rise in many universities and is identified as a necessary foundation for collaborative patient-centered practice systems to succeed.<sup>28</sup> Through the educational use of interdisciplinary high fidelity simulation in advanced practice nursing curricula, the NP can be educated comprehensively for future collaborative healthcare provided for quality management of patients.

### **High Fidelity to Increase Cope of Practice Knowledge and Value**

The misconceptions regarding the degree of NP competency represent factors that create barriers to effective NP and physician collaboration.<sup>27</sup> When a physician lacks the understanding of the scope of practice of the NP or educational background, there is difficulty in understanding the NP role of collaboration during patient care which could lead to poor patient management.<sup>27</sup> High fidelity simulation experiences for NP and physician teams or NP student and medical student teams would provide practitioners from both disciplines the opportunity to collaborate together and gain appreciation for each other's roles and scopes of practice in a safe and non-threatening environment. According to Kyrkjebo et al.<sup>10</sup> and Reese et al.<sup>16</sup> undergraduate nursing students and

medical students with simulation experience in university curricula also found the simulation experience to be irreplaceable as this was their first opportunity to work together, along with other interdisciplinary partners.<sup>10,16</sup> Mutual understanding of scope of practice and competencies by physicians and NPs developed through the use of high fidelity simulation has the potential to enhance collaboration and patient management improving the continuum of patient care and safety.

### **High Fidelity Simulation to Enhance Professional Respect**

Lack of respect has also been identified as a barrier in collaboration between physicians and NPs.<sup>27</sup> Despite the increasing number of NPs practicing in the healthcare setting, there remains a hierarchical medically dominant management structure that prevents physician and NP collaboration and quality of care provided to patients.<sup>27</sup> Medical students, medical residents, and nursing students have identified an advantage through high fidelity simulation in interdisciplinary education with the opportunity to focus on other team members' perspective and increase understanding the different roles of professionals.<sup>10,28</sup> According to Reese et al.,<sup>16</sup> another advantage undergraduate nursing and medical students identified in high fidelity simulation is a higher degree of awareness of their own role in delivery of patient care and mutual respect needed in the interdependence of other healthcare professionals and their profession. Improvement in interdisciplinary education in professional respect and interdisciplinary collaboration can enhance positive patient outcomes and unnecessary patient errors.<sup>16</sup> At this time, no studies have been conducted on mutual respect of NP and physician during high fidelity simulation experience which provides a basis for the recommendation of further research needed in this area.

## High Fidelity Simulation to Improve Communication

Poor communication has been identified by Clarin<sup>27</sup> as another barrier in NP and physician collaboration. Poor written and verbal communication and poor consensus of goals for patient care between providers cause a decline in collaboration and care quality and safety.<sup>27</sup> The Joint Commission identified poor communication between providers as a cause of poor patient outcomes implicated in 65% of sentinel events analyzed in 2006.<sup>3</sup> High fidelity simulation provides an education experience that has the potential to serve as a foundation for enhancement of communication skills reducing negative patient outcomes. Nursing students, CRNAs, physicians, and college faculty who participated in interdisciplinary high fidelity simulation during crisis situations found that learning occurred in regards to the role each member had in communication and leadership as well as enhanced provider-to-provider and provider-to-patient communication.<sup>12-14,23</sup> University healthcare educators who were nonusers of high fidelity simulation have a like-minded opinion that the use high fidelity simulation in interdisciplinary curricula would enhance teaching interdisciplinary health care team interactions and communication.<sup>29</sup> According to Dillon et al,<sup>13</sup> the common theme among undergraduate nursing and medical students after experiencing interdisciplinary high fidelity simulation was the importance of communication and teamwork when caring for patients. These findings are consistent with the Joint Commission's goals for improving patient safety through effective communication. Nursing students, CRNAs, physicians and anesthesia technicians also identified the need for clear communication within teams as there are sometimes assumptions that all team members notice a change in the patient status, but there was limited sharing of information between team members and limited input into

decision making which has the potential to lead to failure in optimal care of the patient and negative patient outcomes.<sup>12</sup> These findings confirmed that interdisciplinary high fidelity simulations in graduate nursing education and continuing education programs have significant potential for outcomes of improved team behavior, communication skills, and problem solving.<sup>11</sup>

Advanced communication skills in a NP program was studied during non-interdisciplinary high fidelity simulation to establish effective communication skills as this skill is essential to interdisciplinary care of patients.<sup>21</sup> A high fidelity simulation regarding patient communication during difficult conversations in an acute care nurse practitioner program identified a significantly high self-rating of the NP's overall ability to communicate.<sup>21</sup> The perception of effective communication was apparent immediately after the high fidelity simulation experience and persisted for up to four months later.<sup>21</sup> The feedback from faculty who observed the high fidelity simulation with the acute care nurse practitioners reported having overall enthusiasm for high fidelity simulation as a teaching method due to the faculty removal from active participation during the experience to allow students to further increase their level of autonomy.<sup>21</sup> Most importantly, students valued faculty members' immediate feedback on performance which suggested refinement in their communication skills.<sup>21</sup> Integration of communication skills and immediate faculty feedback on performance into interdisciplinary high fidelity simulation is a strategy that could assist in reducing communication gaps between NPs and physicians allowing for effective collaboration and decrease the number of medical errors caused by poor communication.<sup>27</sup>

Medical students, medical residents, and nursing students have utilized high fidelity simulation in their interdisciplinary education. However, NPs have not incorporated high fidelity simulation in collaborative education. Evidence of benefits in other healthcare disciplines and non-NP healthcare providers suggest the potential for increased patient safety by understanding the scope of practice and educational background of the health care team partners as well as effective collaboration with increased respect for professional and effective communication skills.

### **Cognitive and Critical Thinking**

Cognitive and critical thinking skills are enhanced with use of high fidelity simulation in undergraduate and graduate nursing and medical curricula.<sup>14,15,25</sup>

Undergraduate nursing, advanced practice nursing, and medical students who have participated in high fidelity simulation experiences report having learned the importance of prioritizing assessment skills, determining when and how to intervene, solving problems in a critical event, assessing vital signs, as well as identifying abnormal physical assessment findings which all support positive patient outcomes and safety.<sup>1,15,25,26</sup> Nurse anesthesia graduate students who participated in high fidelity simulation found the experience to be helpful in developing critical thinking skills and managing high crisis events without the fear of posing any harm to a real patient.<sup>25</sup> Undergraduate nursing students also found that they developed clinical judgment during their participation of high fidelity simulation.<sup>26</sup> They were forced to anticipate what could happen to the patient and utilized theoretical knowledge they learned in the classroom and applied that knowledge to patient care.<sup>26</sup> Reese et al<sup>16</sup> also found that an interdisciplinary high fidelity simulation between nursing and medical students helped

bridge the gap between theoretical knowledge, readings, and psychomotor skills learned applicable in clinical practice

High fidelity simulation experiences have been effective in enhancing cognitive and critical thinking skills through recognition of significant errors that threaten patient safety, such as verifying patient identification prior to medical management and identifying important medical history such as allergies.<sup>3,15</sup> High fidelity simulation has also made a difference in competence on quizzes and tests after the simulation experience. In a study of nursing students, Brannan and Bezanson<sup>30</sup> reported that undergraduate nursing students who participated in high fidelity simulation experience as the sole means of information regarding acute myocardial infarction, compared to students who had received traditional classroom lectures on acute myocardial infarction scored significantly higher on posttest exams. The benefits of high fidelity simulation are maximized when faculty debrief students immediately following the simulation to incorporate student's clinical experience.<sup>31</sup> The benefits of debriefing help students apply the theoretical knowledge through reflecting on the simulation experience, discuss how students performed individually and as a group, examine the value to working with peers to discern alternative strategies, and uncovers intelligence of participants regarding problem solving.<sup>25,26</sup> Integration of high fidelity simulation can support cognitive and critical thinking skills and reduce the amount of knowledge based errors that are causing poor patient outcomes.

### **Self Efficacy**

Perceptions of self efficacy are still controversial as positive outcome of high fidelity simulation. Results from Brannan and Bezanson<sup>30</sup> found that in an undergraduate

nursing curricula, findings of high fidelity simulation compared to traditional classroom lectures showed no or slight increase in confidence, however, both teaching strategies increased students' confidence when caring for an acute myocardial infarction patient. Qualitative research on self efficacy among graduate nurse anesthesia students indicated an increase in overall confidence in the management of patient care, confidence in assessment and psychomotor skills, motivation to learn more about specific topics, and improvement in leadership skills once again decreasing provider knowledge based medical errors.<sup>25</sup> A qualitative research study among undergraduate nursing students found improvement in self efficacy in ability to perform clinical skills in providing care for patients postpartum.<sup>14</sup> In a study of undergraduate nursing students and medical students during interdisciplinary simulation, Reese et al<sup>16</sup> reported an increased self confidence in the care they provided to patients by taking responsibility for their own learning rather than relying on faculty guidance.<sup>16</sup> More research is needed in the area of interdisciplinary high fidelity simulation and the positive outcomes it has on self efficacy and patient safety outcomes.

### **Conclusion**

Mediocre communication skills, poor interdisciplinary dynamics, and human error contribute to a staggering number of patient mortalities. Changes need to be made in the way practitioners are educated in graduate programs and continuing education courses. Interdisciplinary high fidelity simulation research is on the rise as studies have shown positive outcomes in interdisciplinary collaboration, cognitive and critical thinking skills, self efficacy from the integration of this valuable teaching method into medical and nursing university curriculums as well as continuing education courses within health care

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## APPENDICES