# Defence Global

Land, Sea, Air and Security

May 2019 Edition

## Foreword by Général André LANATA, Supreme Allied Commander Transformation, NATO

## Communications



## Training & Simulation



## Logistics



## Homeland & Maritime Security



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# iEXCEL℠ – A Call to Action!

## Improving Human Performance and Effectiveness in Healthcare

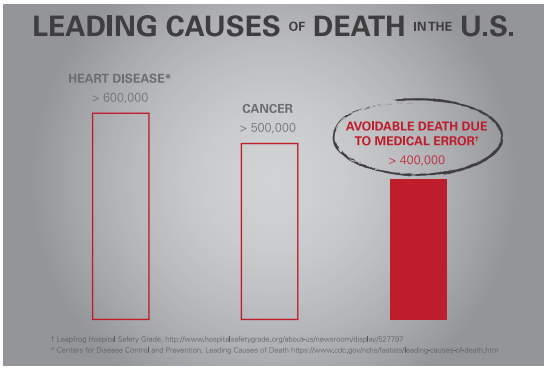
The United States is not alone amongst countries who face escalating hospital mortality rates related to medical errors. Now cited as the 3rd leading cause of death in the US, it is estimated that more than 400,000 patients die annually from hospital-related errors, leaving thousands of loved ones affected. Not considered in this statistic are the lost days at work or the impact on those who suffer resulting permanent injury and/or loss of quality of life.

While it is recognized that avoidable deaths due to medical error are frequently caused by breakdowns in the healthcare system, communication failures between teams as patients transfer through the echelons of care (especially at the "handover") are cited as a major contributing factor. Interprofessional and inter-team communication training is rarely addressed, let alone taught or practiced. In fact, there is growing recognition that the traditional education model for healthcare professionals has become outmoded and is still overly reliant on the acquisition of knowledge through lectures in an era when adopting simulation is possible. In addition, the practice of learning professional skills and procedures on (frequently very sick) patients in highly-technical and fast-paced clinical settings is not considered safe for patients - or indeed, safe for learners.

Meanwhile, a new generation of students is expecting to learn by using digital tools and self-directed, experiential learning opportunities, including the use of engaging mobile platforms, interactive 3D, and augmented and virtual reality (AR/VR). Today's healthcare professions students also find education and training to be less than relevant to their learning styles. They express preference for "learning by doing."

### *Call to Action*

The University of Nebraska Medical Center, with support from the State of Nebraska and generous donations from the community, has funded and supported iEXCEL as a "Call to Action" related to improving the outcomes of care. With the vision of improving human performance and effectiveness in healthcare through the establishment of a state-of-the-art interprofessional, simulation center, the aim is to ensure ongoing experiential training throughout a lifetime of practice. The ultimate focus for iEXCEL is to improve patient outcomes by participating in simulation exercises early and throughout training.




Engaged learning with new advanced visualization tools

Embedded in the model is a strong focus on inter-professional collaboration and teamwork using a wide variety of clinical simulation modalities – thus providing opportunities to practice "over and over" until competent in a given procedure or patient care scenario. Research in human factors - including the impact of stress, fatigue and resilience on outcomes - will also be studied as well as placing emphasis upon practicing and assessing safe patient "hand-offs."

### ABOUT iEXCEL

- Designed to improve the outcomes of patient care through the adoption of an interprofessional, experiential learning model
- Incorporates a competency-based approach to training
- Spans state of Nebraska through network of inter-connected, interactive digital walls (iWalls)
- Utilizes advanced visualization, including 3D, AR/VR and holographic technologies
- Sept. 2019 moves into state-of-the-art clinical simulation facility that replicates the healthcare system spectrum

### ABOUT THE DAVIS GLOBAL CENTER

- 5-level, 192,000 sq. ft. facility featuring dedicated spaces for visualization technologies including virtual reality and advanced clinical and surgical simulation
- Houses the federally-funded *Global Center for Health Security* for specialized interdisciplinary training for responding to outbreaks and care of people with highly-infectious diseases
- Functions as a clinical test bed providing unparalleled opportunities for collaboration related to research and development

In-situ emergency simulation scenario supported by iEXCEL

### *Adoption of Simulation in Healthcare*

While most health professions education involves some clinical simulation activities, these activities are more often confined to the individual disciplines, with interprofessional collaboration and team training rarely taught let alone practiced. In addition, and during a lifetime of modern medical practice, many new procedures and technologies emerge. These rapid advances in technology require learning how to use new diagnostic and interventional technologies, including emerging surgical instrumentation. The successful interface of this complex human-machine interaction is still largely taught by industry in situ, i.e. staff from the companies that actually develop the technologies or medical equipment. A comprehensive simulation center with well-trained staff can – and should – provide a safe venue to practice new procedural skills and partner with industry for training on new equipment or technology. Clinical simulation exercises also create opportunities to learn the "softer skills" that are so necessary for optimal patient care, such as the development of interprofessional communication, critical thinking, diagnostic acumen, clinical judgement and working effectively in healthcare teams and systems.


Students collaborating using iEXCEL interactive digital technology

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UNIVERSITY OF NEBRASKA MEDICAL CENTER
iEXCEL℠

**For more information please visit:**
**www.unmc.edu/iexcel**

### *Lessons from High Reliability Organizations*

Poised to revolutionize health professions education, iEXCEL at UNMC is adopting lessons learned from other High Reliability Organizations (HROs), such as aviation, oil and gas, and the military. These HROs address quality, safety and costs by improving human performance and efficiency using a wide range of modeling, simulation and visualization technologies. HROs also demand the certification of operators prior to real world performance, and at regular intervals thereafter. For example, commercial airline pilots absolutely do not fly a plane in the real world prior to being assessed as competent in a simulator. However, aviation discovered that assessing technical competency alone was insufficient in preventing catastrophic accidents.

Hence the industry moved to address the human factor and communication elements of safety by adding Crew Resource Management (CRM) to the training programs. A significant number of aviation-related losses have been attributed to poor communication (such as a crew member feeling unable to speak up at early signs of trouble). iEXCEL is able to rigorously adopt these lessons learned from aviation and other HROs and apply them to health professions education in order to create an impactful, experiential and interdisciplinary training model that significantly reduces medical errors of all categories.

### *Conclusion*

Traditional real-time supervision and mentorship in the clinical setting by skilled and experienced clinicians has been, and likely always will be of vital importance. However, healthcare professionals at all levels of training are still predominantly learning to take care of patients in highly stressful "hands-on" clinical environments, including learning how to develop professional skills and conduct procedures. Despite reduced opportunities to spend time with patients, lessened availability of busy faculty clinicians, duty hour restrictions resulting in reduced exposure to procedures, and overcrowded rotations at clinical training sites, future healthcare professionals are still expected to perform daily at "tournament level" as soon as they graduate. Professional golfers, commercial airline pilots, or military medics, for example, would not be expected to function under such circumstances without practicing until considered ready (competent) to function at routine and high-stakes events. Creating a more relevant model for health professions education, one that better prepares future and current practitioners to perform effectively in the modern highly-technological and fast-paced healthcare settings, should be paramount.

UNMC is grateful to the state of Nebraska, community leaders, and key global industry collaborators who have partnered to create a transformational model for health professions education.

University of Nebraska Medical Center


# iEXCEL℠ – Ensuring Preparedness

## Dr. Edwin G. & Dorothy Balbach Davis Global Center

*A Clinical Test Bed*

Opening in September 2019, iEXCEL at the University of Nebraska Medical Center will operate out of this new, state-of-the-art facility that incorporates a wide range of innovative and emerging simulation and visualization technologies, including holography and virtual reality. Using a competency-based approach to training, iEXCEL and the Davis Global Center offer safe, simulated and realistic environments for education, training and R&D.

**Contact UNMC for:**

- Biocontainment and infectious disease readiness
- Disaster training and emergency management
- Live Virtual Constructive Exercises
- 3D/AR/VR and holographic module development
- Dedicated simulation environments for technology development, training and testing
- Research and development in human performance and effectiveness
- "NextGen" training opportunities

**Explore training and research opportunities with UNMC** by contacting: Pamela Boyers, Ph.D., at 00-1-402-559-2442 or pamela.boyers@unmc.edu / Omaha, Nebraska, USA

**unmc.edu/iexcel**

University of Nebraska Medical Center